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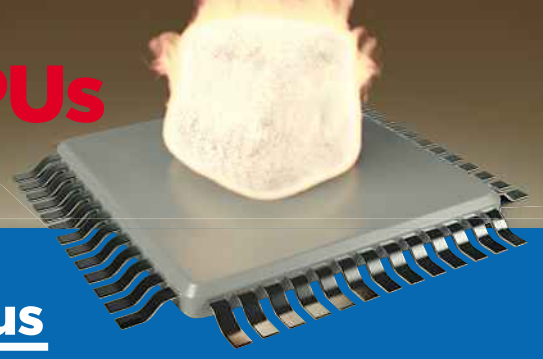

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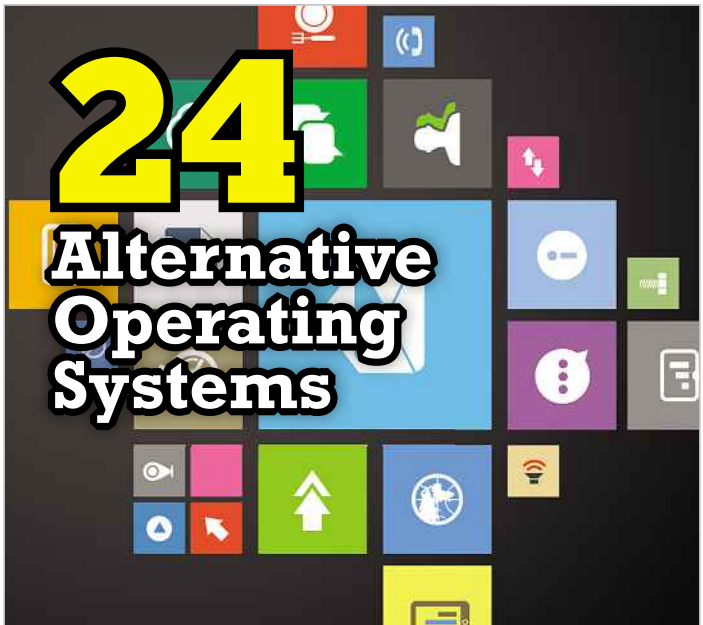



## 08 Things Left Out Of Window 10

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# 46 Group Test: 10" Tablets

# 56 Video Editors

## 56 Video Editors

Whether you're putting together a home movie for your family or hoping to become the next YouTube star, a good video editor is a must. Of course, some programs cost several hundred pounds, so what do you use if your budget is more restricted? Roland Waddilove looks at a selection of affordable editors for PC, mobile and web browsers

## 62 Best Overclockers

Overclocking a processor isn't as difficult as it used to be, but not all chips are capable of performing this particular trick. And of course, some are better at it than others. So how do you choose a processor that's ideal for overclocking? With our handy guide, courtesy of Aaron Birch

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# MIA: 10 Things Microsoft Didn't Put In Windows 10

**Mark Pickavance points out some obvious features that never made it to the all-you-can eat buffet that is Windows 10**

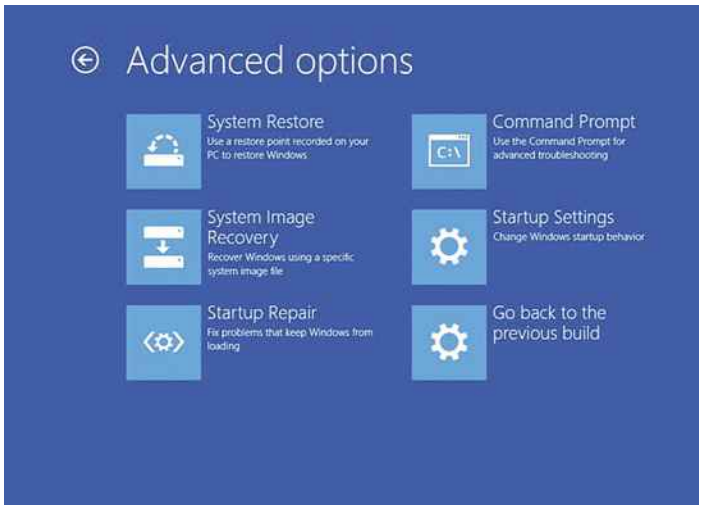
Whenever a product like Windows 10 comes to fruition, those behind it create lots of lists highlighting the new features they've included.

These are good bullet points, especially for those that want to justify the upgrade or for journalists to provide a checklist for their readers.

However, as much as Microsoft will undoubtedly be pushing the line that Windows 10 is the best version of Windows yet, as it did with Windows 8 and before, that doesn't guarantee that it's perfect.

Of course, surely it's the purpose of software to evolve, rather than be a de facto solution. Windows has got better, mostly, though it's also much larger, more complicated and has something of a commercial monkey on its back.

Microsoft, however, must cannibalise previous customers to become new customers, and attract fresh Windows users to grow




its business – something it's done pretty effectively for the past 30-odd years.

Yet on occasion that magic eluded it even in its most successful product, because of directions the company has chosen to take it.

Windows 8 had major issues addressing lots of those people, mostly because it was built with a very specific vision that didn't really embrace many of the existing customers.

That made many people wonder if Microsoft as a business had entirely lost the thread of what made Windows successful, as it yo-yoed through failure with Vista, success with Windows 7 and then failure again with 8.

What we know about Windows 10 is that it will be the final point release of this product line, with all future development morphing this product into its future form, in theory negating the need for specific Windows 11, 12 or 14 launches.

In looking at what Microsoft intends to deliver, and having been on this journey from the outset, part of me is mildly

> **"This diabolical structural mess that allows the OS, apps and user data to mingle like drunken party guests"**

disappointed with what it's come up with. Given the enormous resources and rich history, Windows must be the software application with the most human man hours allocated to it ever, and yet it's flawed in ways that users will see each and every day.

Here are ten things that I feel should have been in Windows by now, but for a variety of reasons they weren't included. Obviously, I'm writing this ahead of the official launch day, so it's entirely possible that Microsoft has hidden some features away in the preview that it'll roll out to surprise us all.

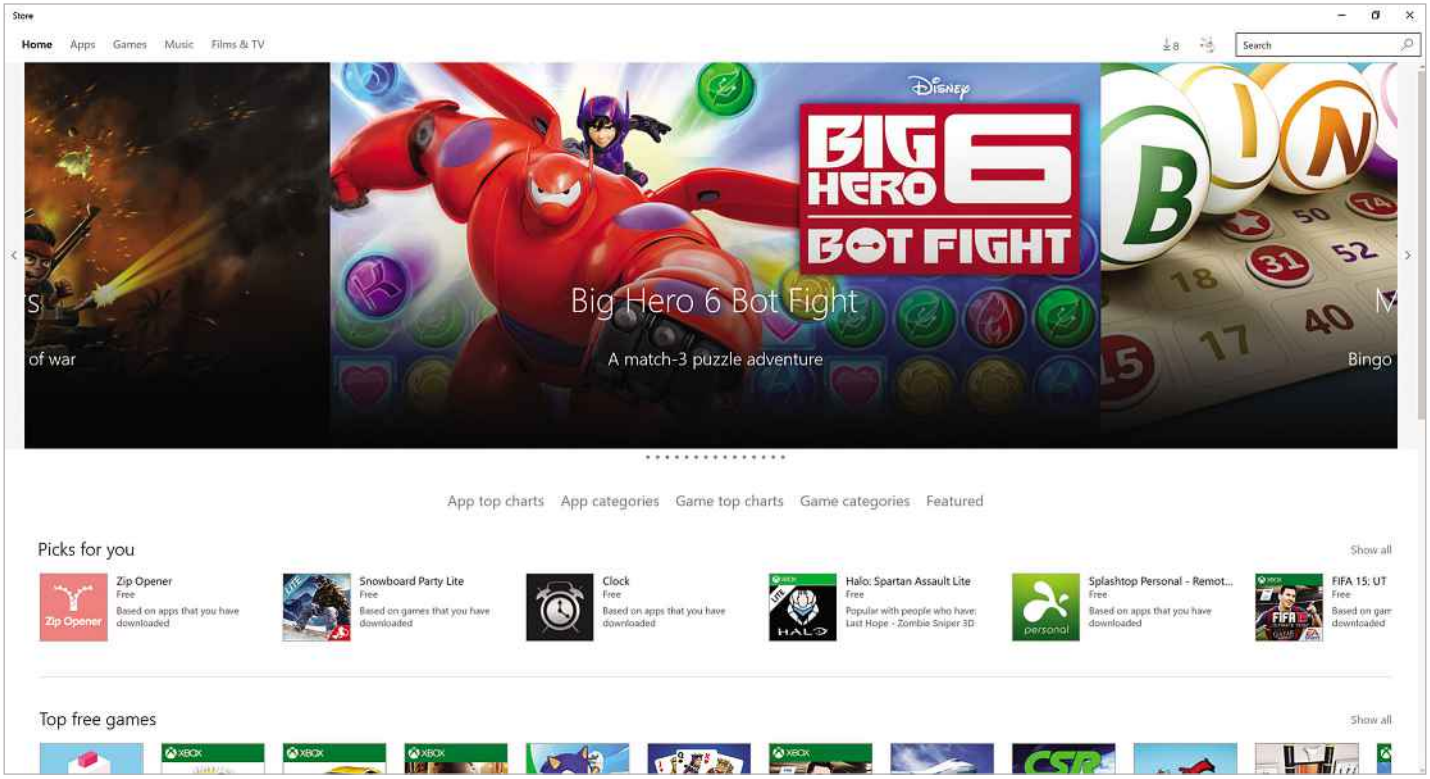
Bearing that in mind, here's my wish list of ten things Windows should really have by now.

## 1. A Proper Backup!

I'm not sure what Microsoft's problem is with users securing their systems, but from the outset it's done almost nothing in this department and made the likes of Paragon and Acronis a small fortune in the process.

With Vista it did introduce a backup tool which, in theory, made an image of the PC that you could recover from. In Windows 7 this bordered on being useful, and then in Windows 8.x it seemed to make great efforts to both hide the tool and remove some of its better features.

One and possibly the only reason I'd consider getting and using a Mac is that Apple has Time Machine, a fantastic piece of software that allows you to secure both your system and



your files effortlessly. Why can't Microsoft deliver a version of Windows with something similar?

There seems to be some political issue with system builders who don't want people zapping their machines back to their raw state and not buying a new PC because it all works well again.

After more than 25 years of Windows, isn't it about time that we had one where backing up just happens and doesn't require third-party tools and a technology degree to navigate?

Having tried to use the Windows 10 preview restore and the Windows 8.x one without any success in restoring a backup it created, the only conclusion I can make is that this is an area Microsoft seems unwilling to properly address for whatever ideological reasons.

Unfortunately, Acronis True Image 11 doesn't support Windows 10, in case you wondered about that.

## 2. Modular Applications

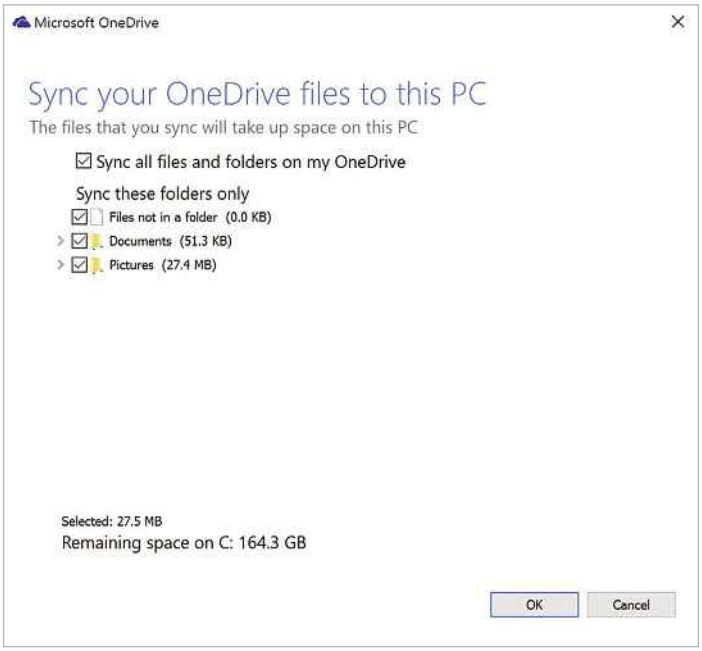
Have you ever tried to take the hard drive from a dead system and pull the personal files off it onto a new one? Yes, it's an almost impossible task, and you'll never actually get the system back to how the old one was, even if you spent a month of Sundays on it.

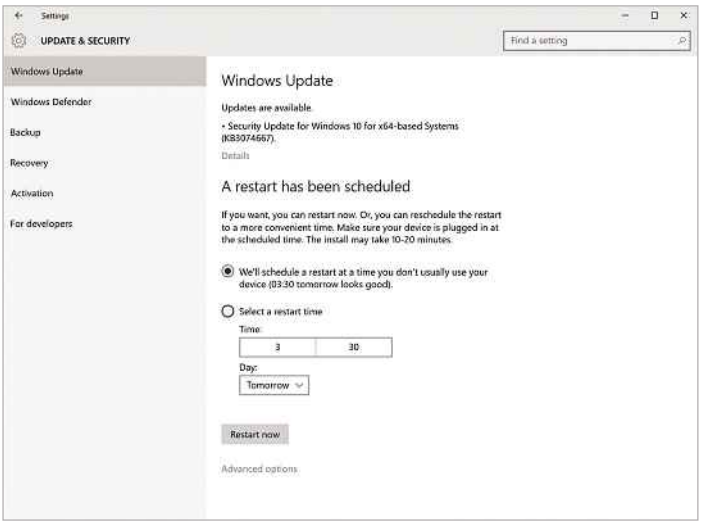
That's because Microsoft built an OS where applications can do pretty much anything they like, inserting registry values here, configuration files there and .dll files all over the show. As a result, there's no modularity, where you can have apps on an external hard drive and then plug it into another PC and just use them.

This diabolical structural mess that allows the OS, apps and user data to mingle like drunken party guests is probably the worst aspect of Windows and has made the lives of IT people a living nightmare for decades.

With Windows 8 there seemed a chink of light with the Store, where once you used apps in it, they could be tagged to be automatically installed when you logged into a new computer. At least, that was the theory.

The reality is that the majority of Metro apps are useless, so most people don't use them, and only now with Windows 10 are Windows 32 API apps coming to the Store. However, they're not included in the auto install mode, and there's still no means to move apps to an external store and then run them (or install them) from there.




I've come to the conclusion that Microsoft assumes that eventually the cloud will come along and avoid it having to create structure and organisation, because it's got very little now.

Users want the OS, software and data to be fully plug and play, so you can quickly get a system configured just like your previous one, and the task of backing up is that much easier.

Whatever Microsoft brought us with Windows 10, it wasn't this most badly needed of user friendly features.

## 3. An End To Forced Restarts

While I was working the other day on my Windows 10 preview system, I decided to change the Workgroup name to the one I use at home (not WORKGROUP). At that point, Windows insists that I reboot! That's so poor in this day and age that it's not even funny any longer.

But what's amazing is how many things that Windows wants to do require a reboot – and sometimes multiple reboots for good measure. Why?

I'll have a stab: sloppy coding that can't track what the implications of changes have and so decides it's easier to pass all these problems to the bootstrap engine to resolve.

If my phone wanted to reboot every time it installed an app or I changed my device name, then I wouldn't use Android, because that would be silly and frankly annoying.

Windows needs to get out of its 1992 mind-set and start thinking like a modern OS, where reboots aren't needed and there's effective memory garbage collection that keeps it running smoothly for extended periods of time.

Like PC makers are addicted to crapware, Microsoft can't kick the reboot habit because it needs to accept first that it has a problem.

Microsoft needs to go to 'Reboot Anonymous' and come clean about its addiction to cold starts.

Windows shouldn't need forced restarts, because users certainly didn't ask for them to continue.

## 4. A Smart Cloud Service

For all its faults, one of the features that Windows 8.x actually got right was its integration to OneDrive, which allows you lots of flexibility about how folders are replicated onto the cloud service.

However, one of the problems that people ran into was the placeholder concept, where you assumed that you had a file on your laptop, got on a plane and then tried to edit it. Finding that you didn't have a copy of the file when it wasn't downloadable was pretty frustrating.

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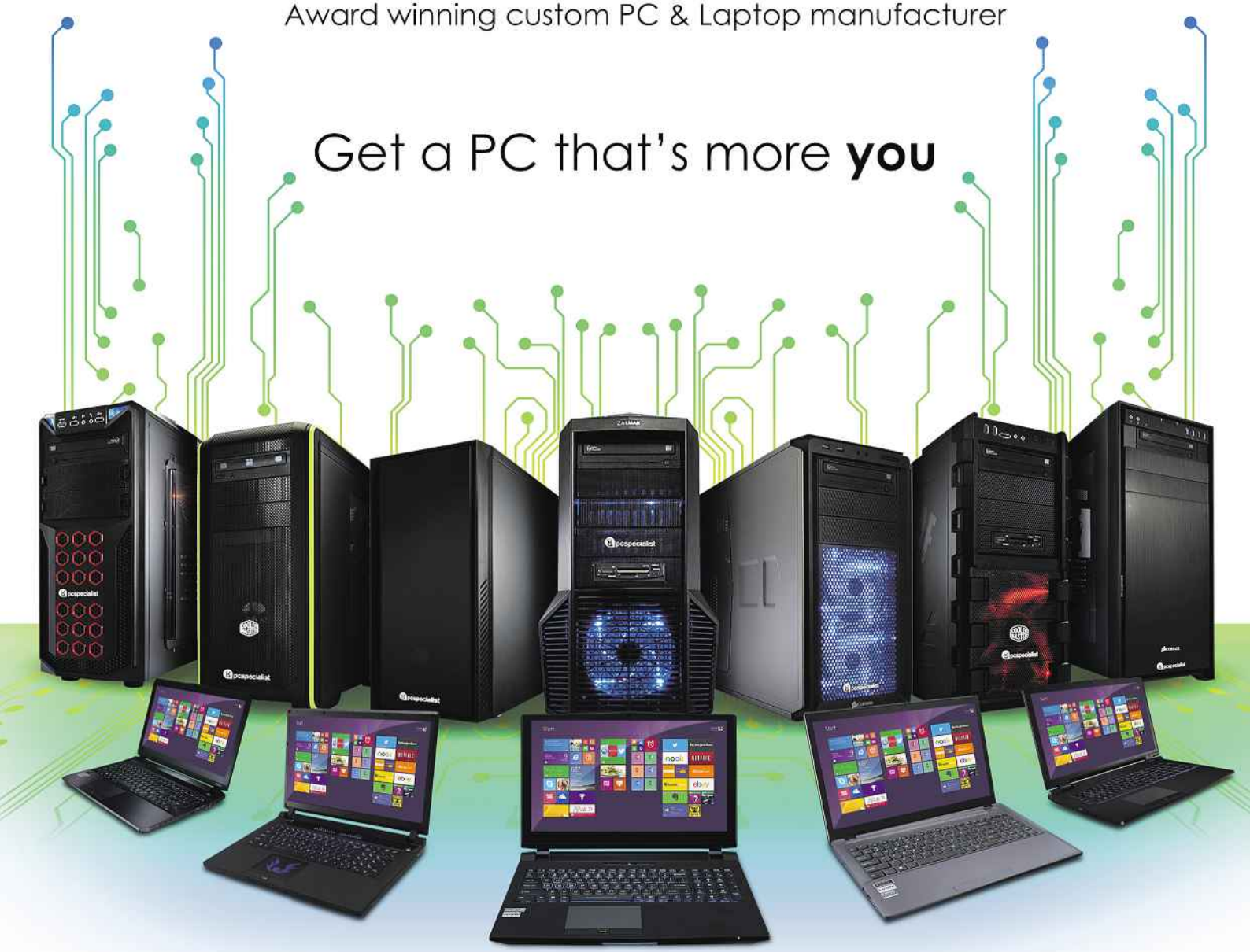

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However, Microsoft's answer to that was to make it much less flexible and remove the placeholder technology altogether, like it worked under Windows Mobile.

Surely developing some way to negate the placeholder issue would have worked better than regressing the facility to something much less useful?

What it's effectively done is relegated OneDrive to being the same as Dropbox – something that's not likely to make people use Microsoft's facility over the one they currently rely on.

Windows 8.x pushed the notion of a seamless cloud integration that Windows 10 just turns its back on like it wasn't anything special. But OneDrive and how it connects to Windows 10 has other problems, not least the way that it stores some personal configuration features but not others.

For example, if you set a background on a Windows 8.x or 10 PC and then log into another, your background appears. But if you have a PC and you like the standard collection of system icons on your desktop, their appearance isn't replicated at all.For this Windows user, having the icons appear on a new computer saves me a job, whereas I really couldn't care less about the background.

What really needs to happen is that Microsoft needs to go through all the things you might configure on Windows and then decide (or let the user decide) which of them to sync through OneDrive – or ideally with any existing cloud service, including personal ones created by NAS boxes.

What's somewhat mind numbing about all this is that for at least the last year or more the senior people at Microsoft have been banging on about the company becoming a 'devices and services' operation, and yet it can't actually deliver this one critical service in a consistent and powerful way.

The objective of any cloud storage system should be to blur the lines between what you have locally and what's stored centrally, and at this time what's on offer here is actually very clearly demarcated.

I actually think this is a fixable problem, if Microsoft has the inclination to address one of the features where oddly Windows 10 isn't as good as its predecessor.

## 5. Custom Touch Keyboards

If you do use touch (and I accept that most people don't), then you'd like the tablet experience to be on par with that offered by Android and iOS. But alas, for whatever logical reason, only Microsoft is allowed to provide the touch input mechanism, so there's no Swiftkey for Windows.

To a degree this is a continuation of Microsoft's insistence on keeping certain functions exclusively for itself, as it did in Windows 8.x with the Metro browser capabilities.

The irony of these choices is that they were made mostly so that Windows 8 tablets had a uniform user experience and weren't really intended to specifically limit the desktop environment.

This is probably a minor point, as the great touch revolution never actually came to the desktop PC like Microsoft expected, but it's another reason why the tablet part of its plan appears to be faltering.

## 6. A Unified Personality

When tiles and 'Metro' apps got introduced in Windows 8, the PC effectively ended up with a split personality, where it wouldn't recall what one part got told just minutes earlier on the other.

The best example of this was IE, where different apps existed on both the desktop and Metro sides, which initially didn't share any information, such as what web pages you had open.

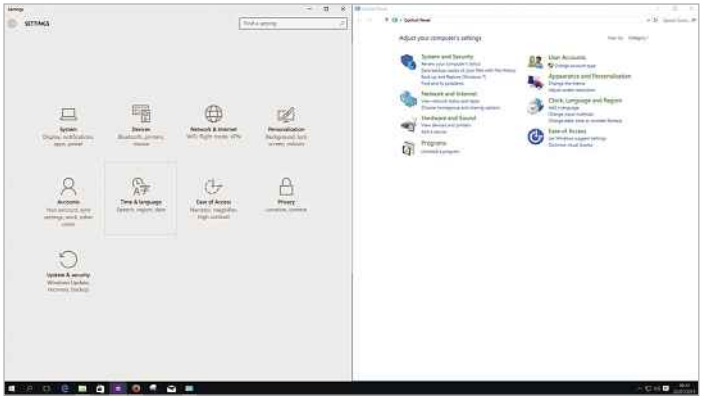
Some parts of the Windows multiple personality disorder have been addressed in Windows 10, but still there are plenty of places where there are things that are partly duplicated in each persona.

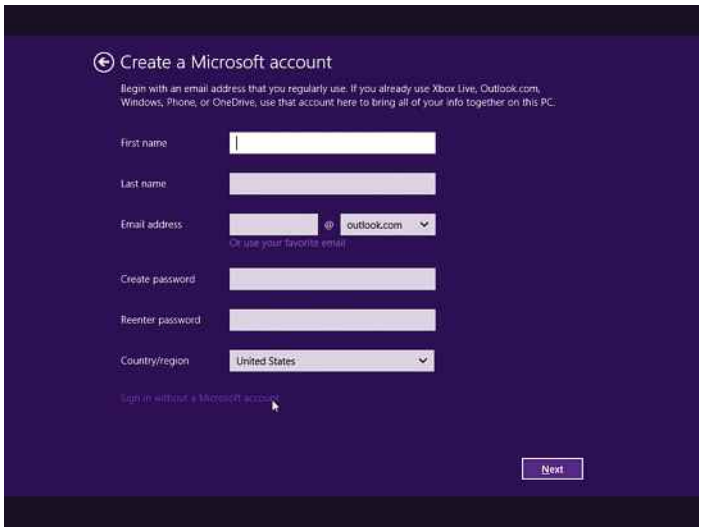
A classic example of this is 'Settings', which contains a subset of what's also accessible in the classic control panel. It wouldn't be too bad if the control panel contained everything, with Settings being less detailed, but it's much worse than that.

> **"Windows 8.x pushed the notion of a seamless cloud integration that Windows 10 just turns its back on like it wasn't anything special"**

There are features that are exclusive to either or merged with those that are common, as if some random selection process went on. Because of this, when you want a control or feature, you're generally forced to look around both until you stumble into it.

Fans of Windows 8 might well argue that you could just search for it using Bing, which technically you can do. However, as a default, if you put 'regedit' into the search of Windows 10, it will bring you a selection of web pages talking about Regedit rather than the app on your computer. You can alter this tendency, if you can find the controls to stop it searching the web by default.






Windows 10 goes some way to joining the two sides of the tablet/computer interface, but it's far from a unified and complete model, and it relies on the user to know where everything is located most of the time.

During the preview phase, the whole menu structure and placement of features has changed continually or evolved, depending how charitable you are.

I just hope that Microsoft doesn't keep doing this on the released version, or finding controls is going to become even more challenging than it already is.

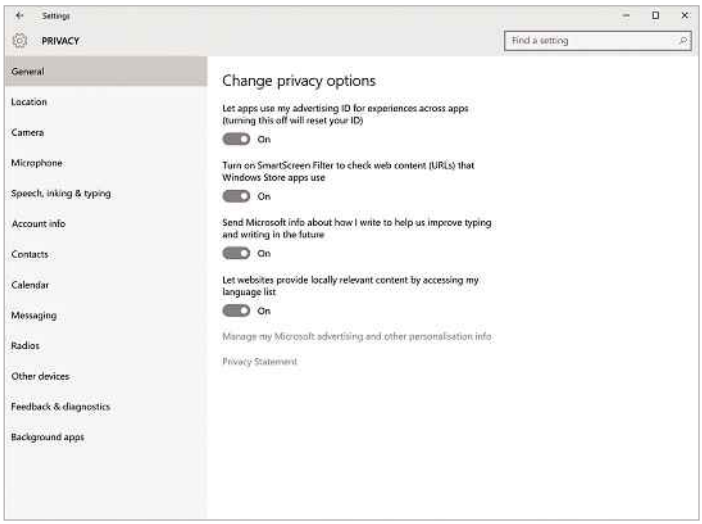
Windows needs one place to change settings, ASAP.

## 7. A More Selective Installation

On my test platform is the latest version of Windows 10, with what is the normal complement of applications that Microsoft has determined are important to all users. And that's a problem, because a significant number of them are entirely redundant on that system for a variety of reasons.

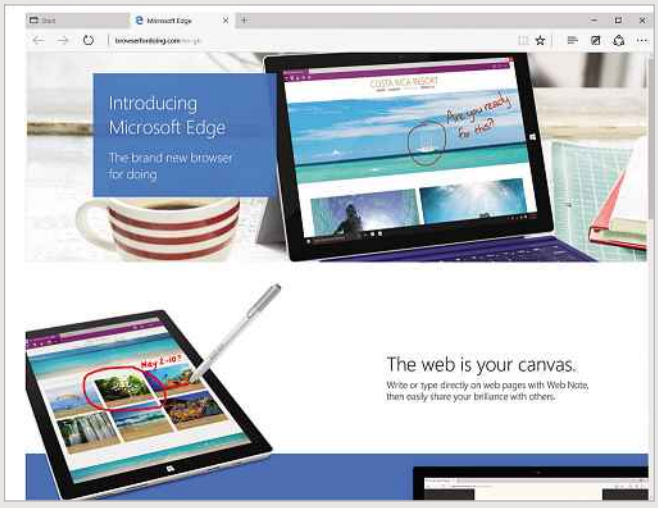
If you're unlikely to join a domain and be in an office environment, there are whole chunks of Windows that will never be used. And home users are also unlikely to want OneNote or, if they don't have a webcam, the camera app.

One can fully understand that Microsoft likes to promote its own products, but surely an installation routine that asks initially what the main purpose of the computer is and then customises things accordingly would be preferable.




## 8 Things I Really Wish Microsoft Left Out...

**1. Cortana:** Most people don't talk to their phones and probably don't want to talk to their PC to use Bing either.
**2. The Modern UI:** Amazingly wasteful of screen space interface.
**3. Virtual desktops:** Linux has had this for decades, and Microsoft's version is very clunky by comparison.
**4. Xbox connectivity:** I'm not buying an Xbox One to play games with extra lag.
**5. Automatic updates:** if it makes a big mess testing an update and releases a PC crippler, people won't be able to stop it installing.
**6. Two browsers:** One IE is bad enough, but the fact it's now competing with itself using Edge is just bonkers.
**7. Wi-fi Sense:** Shares you wi-fi password with people on Facebook. Is that really a good idea?
**8. Continuum:** Window Phone is effectively dead, so it's largely pointless.




This is especially important if you intend to put it on a machine with limited storage, where superfluous items might make all the difference.

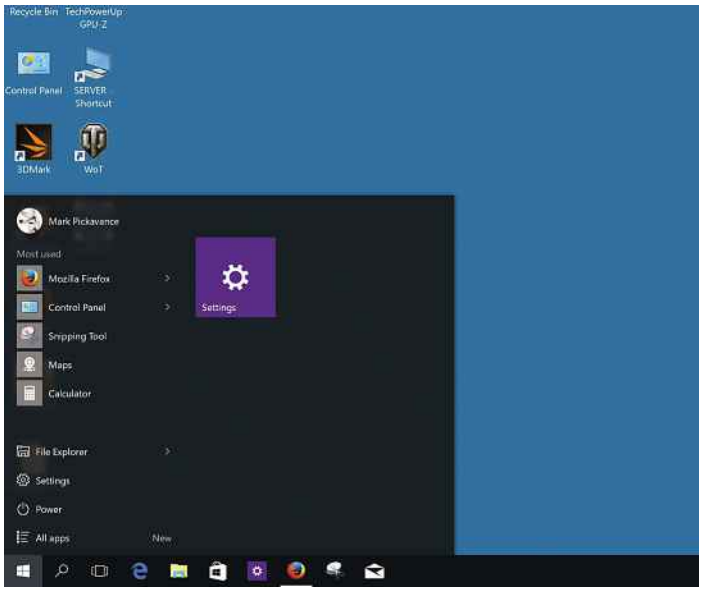
Those expecting Windows 10 to turn the tide of Windows' ever expanding waistline are therefore probably going to be disappointed. Although many of my missing items probably won't turn up soon, a more selective installation routine is probably likely with the Enterprise edition, when that makes an appearance.

## 8. The Presumption Of User Opt-out

Since the arrival of the internet, users have been fighting a losing battle against those who want their data, usually without asking properly for it.

I'm not sure why asking people to sanction their information being used is such a contentious issue, but one might assume that if half the people declined these invitations, then the data gained might not be as useful.

Windows 10 makes all sorts of not very friendly assumptions about how freely you'd like your data splashed around when you review the privacy settings. The submenu would be better titled 'No Privacy', because the default setting lets apps have access to your advertising ID, check your web content URLs,




intercept your typing and pass on what languages and other personalisation info they have.

Be foolish enough to use Cortana, and your email will be checked to see who you communicate with and even work out the relationship between those people and you.

Those who are of the opinion that the default should be to disable the dispensing of user information aren't going to be pleased with this latest attempt to turn user data into a commercial resource.

## 9. A Proper Start Menu

No, surely not! Having told everyone with Windows 8 that the Start menu was 'old school' and that it wasn't coming back, it came back. Yet – and this still boggles my mind – Microsoft managed to make such a pig's ear of returning a feature from Windows 7 that it actually beggars belief.

I'd contest that every alternative Start menu, like Start8 and Classic Shell, is better than what Microsoft took three years to come up with, and they both were available before Windows 8 was out of preview.

In this respect, Microsoft seems to be acting like one of those clothing shop assistants, who decides what 'works best' for you and entirely ignores requests to see certain items in your size.

What users actually wanted was the Windows 7 Start menu back, pure and simple, but Microsoft just couldn't bring itself to do that one simple job. Instead, it had to make it very inflexible, so you can't pin apps to the main part of the menu, and very large even when you don't use any of the tablet icons.

It's possible to manually shrink the menu, and you're forced to do that, because it won't size itself according to what's on it at all.

If I'd asked a software engineer to make this menu, based on what went before, and he came up with what went into Windows 10, he'd get a D- score.

The menu in Windows 10 is either the result of developer petulance or complete ineptitude – the choice is yours as to which it is.

## 10. A Vision

Some people will read this article as just me having a free shot at Microsoft or even as just an antidote to the mainstream media's reaction to anything that the company does when they're not fawning over Apple.

But I'm a Windows user too. I'd like this product to move forward in a way that builds on the past and yet reveals an exciting and interesting future.

My problem is that for all the changes between Windows 7 and Windows 10, the way ahead seems more opaque, not less.

For all my nine prior missing things, there is the critical tenth that dwarfs the rest, that being a vision of what Windows wants to be when it's remarkably long and convoluted adolescence ends.

Windows 8 demonstrated a dream but sadly a terribly misdirected and presumptive one, which really put the skates under the company. Windows 10 does relatively little to address the underlying question about where Windows goes next, other than to hope that people like it and, after the free period is over, buy it.

> **"What users actually wanted was the Windows 7 Start menu back, pure and simple, but Microsoft just couldn't bring itself to do that one simple job"**

The closest thing I've seen to a vision from the company is Hololens, a product that at first looked amazing and revolutionary, but which now seems to have been effectively scuppered by the fiscal bean-counters and those who insisted that it must be a computer in its own right and not cabled to a powerful PC.

Much of what Microsoft has done since Windows 8 appeared seems to be designed mostly to distract people rather than galvanise them into a cohesive customer base. Unless it can come up with and, even more critically, communicate a projected strategy for Windows that doesn't involve making much of feature few will use, then the future looks rather bleak.

And the bleaker it looks, the less inclined people will be to invest their time in learning how to get the most out of Windows, and the more likely it becomes that they'll focus their attentions elsewhere. **mm**

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*Project Soli radar*

# Google's Advanced Technology And Projects Group

**David Briddock uncovers the latest technology from Google's skunkworks-like group**

The Advanced Technology and Projects group (ATAP) is but a small division in the huge Google empire. Yet its impact on the direction of the company and the technology industry as a whole is enormous. The members of this skunkworks-like group are a pretty radical set of individuals – even for a free-thinking organisation like Google. In fact they define themselves as a "small band of pirates. Believers. Makers."

The ATAP group only has around 100 staff, but the key to pushing its radical, groundbreaking ideas into real products is its fast-growing list of external commercial partners, which already number in the hundreds. Yet, while there's plenty of activity going on, in true skunkworks tradition, details of the group's projects are hard to come by. However, at its recent I_O 2015 developer conference Google unveiled some fascinating technology – and a number of surprises.

## Project Soli

Project Soli was debuted at the Google I_O 2015 event by project founder Ivan Poupyrev (**ivanpoupyrev.com**) and lead developer Jaime Lien. As the presentation gathered pace the knowledgable audience migrated from hushed amazement to wild enthusiasm about Soli's potential; by the end, they clearly showed their delight in what this team had been able to achieve. Soli technology has been a hot topic of conversation ever since. The key question that's being asked is: 'Has Google just made current motion detector/controller obsolete?'

It's too early to answer this just now, but there's no doubt Project Soli appears to be a game changer in terms of user interaction. It captures tiny finger movements and full hand gestures in three dimensions. Yet there's no need to touch a physical surface – and it doesn't involve any kind of camera technology.

> **"While there's plenty of activity going on, in true skunkworks tradition details of the group's projects are hard to come by"**

## Soli's Miniature Radar

So how does it work? It's all down to an innovative new sensor coupled with some very smart software.

Soli sensors broadcast high frequency radar waves and capture any reflections. This arrangement allows it to distinguish movements in the sub-millimetre range and ascertain the distances of objects from the sensor. It can also capture motion at up to 10,000 frames per second, which is far faster than any camera-based system could manage.

Highly specialised software algorithms then make sense of these complex wave patterns. These algorithms themselves were devised through the application of advanced machine learning technology – which of course is one of Google's key strengths.

Most importantly the laptop-sized sensor development rig has been shrunk down to a single thumbnail-sized chip. With help from certain manufacturing partnerships, all this was done within an amazing 10 month timescale; there's already talk of a Soli developer kit release later this year.

## Soli Applications

It's clear the Soli sensor chip and accompanying software could be integrated into just about any device, from PCs and laptops to tablets and smartphones. However, Soli really excels when the screen shrinks to watch-sized dimensions. The ability to precisely control a smartwatch-based app through natural, real-time, in-the-air finger movements and gestures makes existing interfaces, including the Apple Watch, seem clumsy and dated.

In fact, because no physical touch display or camera capture system is needed Soli is applicable to a wide cross section of home appliances and products – like portable bluetooth speakers. Soli would also be perfect for in-car control, navigation and entertainment systems.

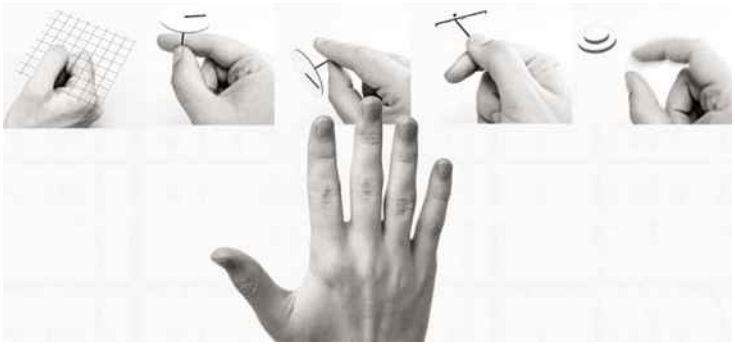
Wearables are another obvious area, from Google Glass-like applications and wrist bands, to technology that could be embedded into our everyday clothing.

Which brings us neatly to the next ATAP project...

## Project Jacquard

Immediately after his Project Soli presentation, Ivan Poupyrev announced another initiative close to his heart: Project Jacquard (**g.co/projectjacquard**). While it continues the theme of improving user interaction with small-screen or no-screen devices Project Jacquard is all about expanding the user interaction area. It does this through some clever smart wearable technology that goes far beyond the rather crude integration we typically see today. As Poupyrev mentioned in his presentation the problem with smart watches, fitness bands another similar types of devices is that not everybody wants to wear one. However, we all wear clothes, so why not make them smart?

*Ivan Poupyrev wearing a Jacquard jacket holding a Soli chip*



*Project Soli gestures*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*Project Jacquard yarn*

## Jacquard Yarn

The key to Jacquard's considerable potential is that it's based on a new type of yarn. It's a blend of existing fibres (cotton or synthetic) and highly conductive threads, braided together in the usual way. This approach solves a number of tough challenges. The yarn looks and feels like any other textile yarn and can be used on existing industry weaving machines to manufacture garments at scale. It can be made in any colour so textile fashion, design and innovation is unimpeded. And the finished article can be pulled, stretched, folded and washed.

> **"Project Vault developers implemented a complete security computer in an innocuous looking SD card"**

The Jacquard team also worked with industry partners to design special processes that bring the woven conducted fibres together into small, discrete connectivity points using 3D meshing techniques. The end result is a garment with one or more regions that act like multi-touch sensing trackpads. These regions recognise swipe, tap or pinch gestures and even identify the number of fingers involved.

## Jacquard Potential

On stage, Poupyrev himself wore a Jacquard-enhanced ivory jacket, hand-made by a Saville Row tailor, that could interface with smartphones, tablets and watches.

Google also managed to recruit the Levi Strauss Company as a partner. In fact, Levi's head of global product innovation, Paul Dillinger, walked onto the stage to extol the virtues of Jacquard technology and state his company's desire to make interactive clothing a reality.

Jacquard technology opens up a brand new vista in the clothing industry. One where fashion designers and software developers can work together to create an endless variety of smart clothes and garment apps that seamlessly integrate into our everyday lives.

## Project Tango

One of the most intriguing ATAP initiatives presented back at I_O 2014 was Project Tango. In essence Tango empowers a mobile device with the same kind of visual and topology sensing we ourselves use to navigate the physical world. It delivers this fine-grained local-area spatial perception through the application of advanced computer vision, special vision sensors and image processing software.

## Tango Technology

In case you're wondering, Tango isn't just another AR/VR headset scenario. Instead these immersive experiences are generated in a real-time fashion on the screen of a modified Android tablet. This tablet has an extended array of sensors and cameras that capture up to 250,000 measurements a second. The captured 3D spacial data targets motion tracking, depth perception and analysis of the surrounding area.

Motion tracking enables the device to understand its position and orientation in real-time. Depth sensors evaluate the shape of the immediate locality, and the device uses visual cues to help recognise nearby objects. In practice this means Tango can build a 3D model of an object or complete room. Something that would obviously be a boon to 3D modellers and 3D printing projects.

## Tango Gaming

To showcase how Tango technology can enhance gameplay a number of companies have produced Tango-centric games such as *Zombie Gunship Reality*, *Cowpocalypse*, *Bullseye's Playground* and *Project Tango Explorer*.

Taking *Zombie Gunship Reality* from Limbic Software as an example, it's a fresh spin on Limbic's hit mobile game *Zombie Gunship*, which already has a following of over 10 million players worldwide. Here, the simple gameplay sees the player installed in the gunner seat of a heavily-armed AC-130 ground attack aircraft (**goo.gl/w3KoBN**) and tasked with eliminating a zombie threat while defending the remaining survivors of the ongoing apocalypse. By taking advantage of the Tango hardware, the player is immersed in a world where the device itself becomes the gunship.

## Tango Future

Project Tango has attracted a large number of hardware and software partners, including ABSquare, Infineon, NVidia, Open Source Robotics Foundation, NASA's JPL and the University of Minnesota. And the second incarnation of the Tango-modified 7" tablet-based dev kit is now available for developers (**goo.gl/na5kpX**).

However, this dev kit is for US developers only, and costs a hefty $1000. There's no sign of a product launch programme in the near future, so what's next for Project Tango? Will it remain a separate project? Will it become entangled with another ATAP project? Or will it be quietly dropped in a Google Glass-like fashion? Only time will tell.

## Project Abacus

Nobody likes using passwords; more importantly the security risks they engender are well known and frequently publicised. Just like Apple, Microsoft and others, Google wants to provide a better solution to the security authentication problem. An ATAP group has been working on a system that captures user interaction and other

*Project tango developer tablet*

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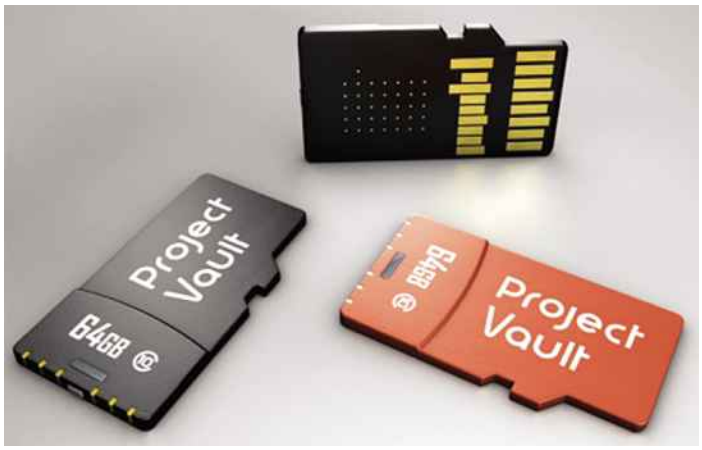


*Project Vault SD cards*

distinctive patterns – everything from how they type to their walking gait – to create a unique fingerprint for each and every user.

Project Abacus was set up to gather this kind of data from a large group of individuals, recruited from a total of 33 universities across the US. The result is 40TB (40,000GB) of sample data, which can be analysed and investigated by purpose-built machine learning algorithms. One of the goals is to build a solution that can be deployed as a software update to existing smartphones and tablets. One that also offers a range of authentication scenarios, from the low level access to the kind required for online banking and commerce services.

However, Google is also keen to establish a robust, hardware-level solution to securing personal data.

## Project Vault

We're all familiar with the SIM card in our mobile phones. It's there to securely protect network data and services, and it does a pretty good job. Google, however, has been asking why there isn't something similar to protect what's important to us? The solution devised by the Project Vault team is a rather an innocuous looking SD card. Nevertheless, inside it holds is a complete implementation of a security computer running a specialised Real-Time Operating System (RTOS) on an ARM processor, plus a short-range NFC wireless antenna for authentication purposes.

Led by security guru and ex-hacker, Peter Zatko, the ATAP team have added a suite of cryptographic services, including hashing, signing, batch encryption and a hardware random number generator.

Intriguingly the team ensured RTOS has no implicit drivers. Instead it appears to have just two files, one read and one write. It stores encrypted data onto what the host device thinks is bad disk sectors. And this driverless card works on any platform – Windows, OS X, Linux, Android and so on. If it has an SD slot, it just works.

Data is transferred via fully encrypted cypher text, which only makes sense to the sender and receiver. Most importantly no keys or crypto-specific data are shared between the communicating devices.

When can we buy one? Unfortunately, at this point in time that question is unanswered.

## Project Ara

Do you remember Project Ara? It's a flexible, multi-module, snap-together smartphone where the owner determines the module combination and so dictates what functionality their handset actually contains. Google has been working on Ara since 2013 and we've mentioned it in the *Micro Mart* pages a number of times since then. Yet, despite enormous media and public interest it doesn't seem to be any closer to becoming a product you can buy.

On stage at its I_O 2015 conference Google demonstrated a working Ara handset that was plugged together and boot in around 60 seconds. A missing camera module was then added and instantly recognised by the device's operating system. However, don't get too excited just yet. We're afraid these devices aren't going to appear in your local phone shop anytime soon.

Google has admitted the challenges were much tougher than it originally envisioned; while it said a market pilot would take place in 2015, the disappointing punchline was that we'd have to wait for the next developer conference for a news update.

Which means it could be years before we have an Ara smartphone in our pocket.

## Magic Leap

Finally we have the intriguing Magic Leap project. Unfortunately, this is still firmly classified as top secret. So what do we know so far? Well, it's attracted interest and financial backing from a wide range of highly influential individuals and organisations, who have already pledged a total of over $500 million. Which all sounds very encouraging, as with this sort of funding it would be pretty much impossible for Google to quietly drop this particular project.

However, commercial funding appears to have forced Magic Leap out of the mainstream ATAP environment. This ensures it can remain highly secretive, even for Google employees who already work on other ATAP projects. Some suggest, though, that it may lead to the birth of a brand new company built around the technology.

## Magic Leap Innovation

Judging from the carefully leaked details it appears to be a direct competitor to Microsoft's HoloLens headset, which blends augmented reality and virtual reality. Interestingly both may appear as purchasable products sometime in 2016.

The key difference with HoloLens is that Magic Leap technology isn't supposed to need a display screen. Instead is seems there's a tiny projector that beams images directly into the retina via a transparent lens. The talk is that this arrangement fools the eye and brain into believing digital images actually exist in the real world.

All we have so far is a few tantalising pieces of information and a couple of short videos, the latest of which looks pretty impressive (see Links boxout). So, for now, the future of Magic Leap is still shrouded in mystery.

## ATAP Future

What we've covered is a pretty impressive list of ideas and innovation. Yet there's bound to be even more unannounced hardware and software initiatives going on right now.

And Google seems to have learnt a few lessons from Google Glass and is keen to bring commercial partners on board as soon as possible. That means many of these ideas, concept and prototypes are destined to become real products. **mm**

### Links

**ATAP videos:** goo.gl/olnez3
**Project Soli video:** goo.gl/ciB9HP
**Project Jacquard video:** goo.gl/IPNjKR
**Project Tango home:** goo.gl/RuRcZq
**Project Vault video:** goo.gl/EbuEiV
**Project Ara demo video:** goo.gl/Xx3ESu
**Magic Leap video:** goo.gl/iCczCX

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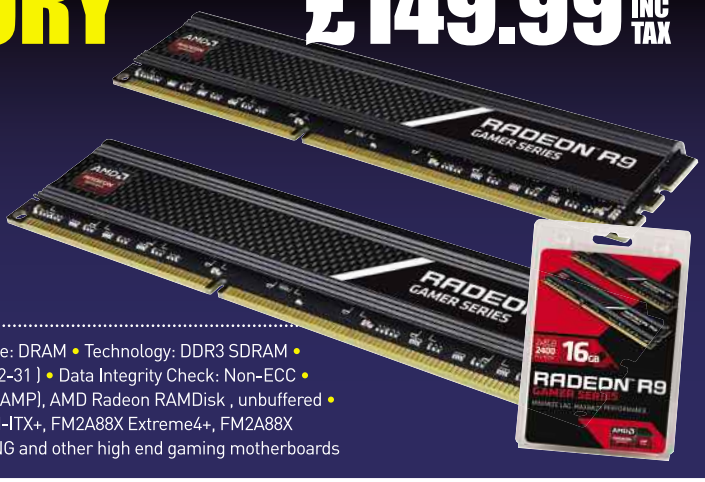


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# Alternative Operating Systems

**Keir Thomas takes a walk on the wild side of desktop operating systems that offer an alternative to Windows and Linux**

The desktop wars are over and the surprise result is that we don't care who won. It's all about what you can do online nowadays, and Microsoft's even giving away the latest update of Windows.

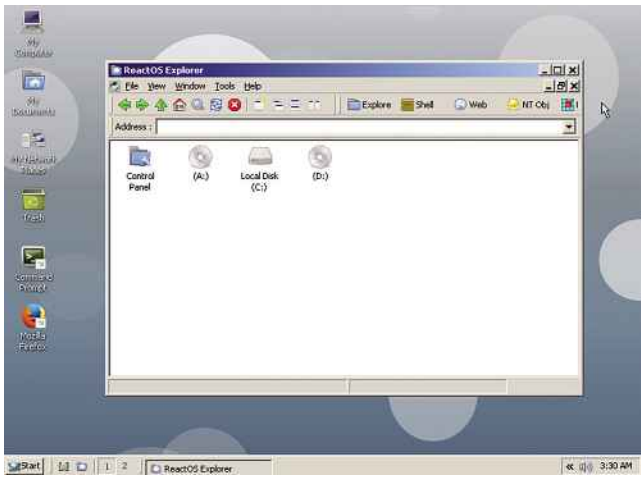
That said, the desktop is still the jumping off point for PC users, and those who find Linux as irksome as Windows might be wondering if there's a third choice – something that's neither, yet provides the basic capabilities we've all come to expect.

Below we look at four candidates. Bearing in mind the tremendous time and expense that's gone into creating Microsoft's product, along with most Linux distros, we simply can't say the operating systems are a straight swap-in. However, for the user who isn't afraid to get their hands dirty, they offer more than you might think.

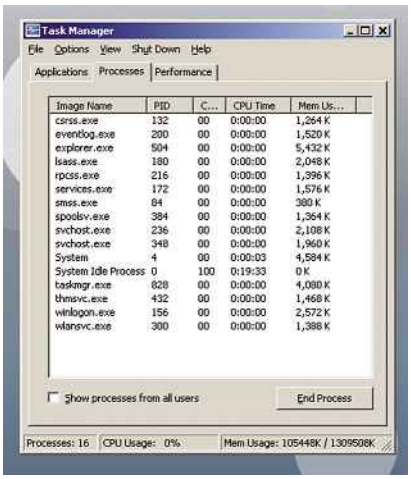
## ReactOS

ReactOS (**www.reactos.com**) was a child of the mid-1990s desktop war. The project's goal back then, as now, was to provide an open source and free clone of Windows. That's an actual, binary-compatible swap-in and not a version of Linux/Unix that merely apes the look and feel. The goal has since mutated into an attempt to recreate the Windows NT architecture and APIs, which means binary compatibility with not just software but also device drivers. In other words, you should not only be able to install the latest Microsoft Office direct from DVD/download, with no additional hacks, but also the latest Nvidia 3D drivers.

Well, you'll be able to do that at some point in the future. Since its inception in 1998 the project has been in pre-release stage (alpha) because, as strange as it might sound, a group of enthusiastic volunteers struggle to keep up with a million-billion-dollar corporation that's constantly redefining its product. That ReactOS has come so




▲ *ReactOS looks, feels and works like classic Windows mode under XP, and most built-in apps look identical*




▲ *Look familiar? This isn't a Microsoft product! ReactOS's wizards and windows mirror Windows almost exactly*

far is laudable, and it works via a combination of original code created by the project members (including an NT kernel), along with some bolt-on bits from the Wine project (**winehq.org**), which creates a Windows emulation layer on Unix/Linux.

What you get when ReactOS boots is a desktop that looks spookily similar to Windows XP in classic mode (and the ReactOS team have promised never to embrace Metro design concepts). This includes everything from the Start button to Windows Explorer, and basic apps like Calc, Notepad, WordPad and Paint. Pop-up windows like driver installation wizards or the task manager are essentially identical to Windows.

One of the biggest and most welcome non-standard features is the Application Manager, which links straight to freeware, shareware and open source Windows apps that are known to work with ReactOS. Examples include Firefox, Thunderbird, OpenOffice.org, 7-Zip and more. Most seemed to work just about okay in our tests but, to be honest, freezes and crashes weren't hard to bring about.

The ReactOS YouTube channel shows somebody installing and using Microsoft Office 2007, which is pretty impressive. We wanted to install Office XP but couldn't find a way to get the installation files into our virtual machine. We couldn't get Windows file sharing (that is, Samba) to work, for example, and an attempt to access a home-made web server resulted in a web page with distorted text.

With its potential for the fuss-free recreation of Windows, which surely is a desire of many business users, and its ability to be compiled for ARM hardware, it's a small mystery why ReactOS has never picked up corporate custom in the way eComStation has (see below). That said, ever keen to avoid imperialistic American influence, the Russian government has shown interest in ReactOS, and even Vladimir Putin has pushed a cursor around its desktop. Indeed, despite its longevity and the fact that right now ReactOS isn't ready for primetime use, its story is still being written.

## eComStation

OS/2 provides a fascinating chapter in the history of computing that features once typical Microsoft treachery versus the striving of IBM to be relevant for desktop computer users.

IBM failed, of course, but not before garnering significant corporate clients including a chunk of the worldwide banking and manufacturing industries. Most Westerners are heavy users of OS/2 without knowing it, because it continues to run older cash and ticketing machines, while companies like Siemens use it to run industrial machinery. This is at least partially because OS/2 scratched multitasking and security itches that were mere pipe dreams for Microsoft of the era.

Of course, this being the world of computing, there's also a community of die-hard OS/2 fans out there, so when IBM decided to finally step away from it in the late 1990s a handful of third-parties continued development via the eComStation project. The latest release – 2.2 Beta II – came out in December of 2013 but the project is still very much alive.

It's important to note that although eComStation is a proprietary, commercially oriented project that has the original OS/2 at its core, it isn't an open-source hobbyist recreation or an emulation. You can download a live CD/ISO demo from **www.ecomstation.com**, but if you want to run eComStation full time you'll have to pay an $82 yearly subscription fee if you're a business or $41 if you're a home or student user. Bearing in mind Windows 10 will soon be free for most people, this is a bit tough to swallow.

Don't release the moths from your wallet just yet, though, because eComStation is an operating system that has fallen badly behind the technical times. It's 32-bit only, for example, so can only address up to 4GB of RAM, and it simply won't work on modern UEFI-based computers. Very limited hardware driver support means there's no USB 3.0. On the other hand, eComStation will install and run just as sweetly as OS/2 ever did on older hardware,

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*eComStation picks up the dying embers of OS/2 and, well, keeps them glowing just that little bit longer so corporate users don't have to scrap old systems*

*An old-ish version of Firefox is provided with eComStation and provides an acceptable if ugly contemporary browsing experience*

and it works well as a virtual machine (which was how we tested it and how many corporations now make use of it).

Booting eComStation is pure 1990s nostalgia, with a variety of desktop tools and widgets that give a feel of Linux of that same era (or perhaps Amiga OS?). Who doesn't want a six-screen virtual desktop tool or a CPU usage graph built right into the taskbar?

It's hard to overemphasise how dated eComStation feels. We're not even sure on-screen fonts are anti-aliased, for example. A concession to the modern times is the Firefox web browser, which is the extended support release (ESR) version 10 that's pretty ancient now but still offers basic HTML5 support. A lack of web fonts like Arial and Tahoma makes browsing a little strange, but it can be done, and while there's no Adobe Flash support, this is less of an issue than it used to be. Some HTML5-based video playback is possible, and YouTube should therefore be a possibility, but it choked on the old version of Firefox.

eComStation also involves a pretty solid DOS platform (and an authentic one, thanks to Microsoft's input back in the day). Despite eComStation's bravado in attempting to remain relevant to modern users, it's blindly obvious that its purpose is to act as a roll of virtual duct tape for systems that shouldn't exist any longer. For the rest of us eComStation is an interesting curio, and it should be remembered that the subscription fee includes tech support to get it up and running. You really can use it on your desktop PC, if you're that way inclined.

## Haiku

Talking of history lessons, BeOS was the little engine that could – and then didn't. Developed from the ground up in the 1990s as a multimedia operating system, it also introduced user interface design concepts that meant it was genuinely easy to use – compared to alternatives at the time, at least. Most importantly, audio and video playback and manipulation was blazingly fast in an era when watching a 352x240 resolution music video from the Windows 95 installation CD made us feel sci-fi.

The fact that BeOS was not sold to Apple in 1999, as many expected, heralded the Steve Jobs era when he sold them his NextSTEP operating system instead. Deflated like a leaky balloon, BeOS would be sold off to Palm (remember them?) and within a few years had a headstone in the crowded operating system graveyard.

Fans of BeOS weren't about to let it go, however, and Haiku (**www.haiku-os.org**) is an attempt to recreate the magic. In an age when even your gran's crappy mobile can play 1080p video, Haiku has dropped the multimedia boasts and instead focuses on "targeting

*Haiku is brave enough to continue BeOS's innovative user interface that relies on right-clicking to bring up app menus*

*VLC Media Player support in Haiku pushes it beyond a mere curiosity and makes it a real prospect for an alternative desktop OS*

# How 3D-printed rats could offer schools a vegetarian dissection



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personal computing" via a "fast, efficient, simple to use, easy to learn, and yet very powerful system."

Once again this is a complete ground-up recreation of an older operating system rather than a skinned version of Linux/Unix. That said, Haiku is itself open source, and the folks behind it aren't afraid to judiciously borrow here and there – the network drivers come via FreeBSD, for example, which means Haiku should support the majority of wi-fi hardware. Compared even to Windows, that's an extraordinary boast. Some components even come from the original BeOS, which was partially open-sourced before pallbearers arrived.

Using Haiku is almost identical to using BeOS back in the day, and it retains the characteristic yellow 'stacked' menubar system that was a precursor to modern tabbed interfaces. Right-clicking on the desktop shows a menu by which apps can be accessed, alongside configuration options, and open windows are minimised to the Deskbar at the top of the desktop. A full and very readable user guide is provided by which you can learn tricks and terminology that can make Haiku very productive.

New software can be installed via the HaikuDepot package manager, based on the same principle as most Linux package managers. We simply couldn't find this on the myriad app menus provided by Haiku, however, but we did find its website catalogue (**depot.haiku-os.org**) and it shows a healthy list of apps such as VLC Media Player, BeZilla (a Firefox derivative), MailNews (a Thunderbird derivative) and Caya (an IM app). The only tool missing is an office suite, although the Haiku developers point out ThinkFree Office (**www.thinkfree.com**) works fine because it runs on top of Java, which Haiku supports. You could also use any online office suite, of course, thanks to BeZilla being HTML5-compatible.

Of all the alternative OSs reviewed here, Haiku is perhaps the best contender for everyday desktop use, thanks to the HaikuDepot apps and broad wi-fi support. Don't expect it to be optimised for modern hardware (the Nvidia graphics driver doesn't even support 2D acceleration, never mind 3D or modern compositing techniques), and Adobe Flash support is again missing. However, Haiku's a competent effort that despite its alpha testing status was stable and speedy during our time with it.

## Syllable

Syllable (**web.syllable.org**) is something of a Heinz 57 operating system. It grew from the ashes of AtheOS, which was apparently abandoned because its creator wanted to learn how to fly (in an airplane, not by jumping off buildings). Begun in 1994, AtheOS had been an attempt to build on the Amiga OS legacy, although it would end up borrowing a little from BeOS for its file system and program interfaces, and pursuing a path independent of both Amiga OS and BeOS in any case (and not being binary compatible with either to boot, meaning you couldn't run Amiga or BeOS software).

AtheOS raised eyebrows for what at the time were technical triumphs such as support for symmetric multiprocessing, pre-emptive multitasking and multithreading. Some anticipated AtheOS one day providing a third man to the duelling partnership of Windows and Linux.

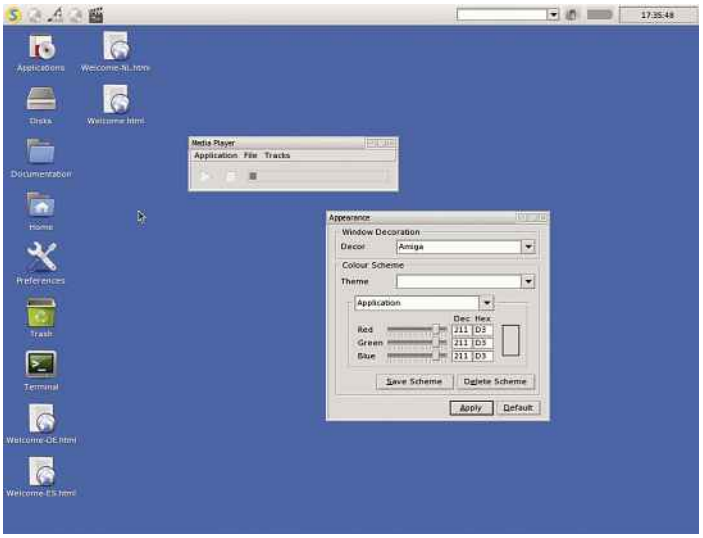
Because time and technology have since moved on, the folks behind Syllable no longer make such boasts and instead talk of it being an easy-to-use operating system for the common man. Booting Syllable shows a desktop styled a little like Amiga OS of old, but borrowing much from the classic Windows XP-style taskbar and Start button arrangement – except here the taskbar is at the top of the screen by default. Desktop icons should be familiar from most Linux users because they're borrowed from the popular Tango set.

A handful of core apps are provided out of the box, including a WebKit-based browser, basic email client and media player. Support for typical video formats is provided by FFMPEG inclusion, as you might find in Linux or Unix, and graphical configuration tools are provided for most system requirements.

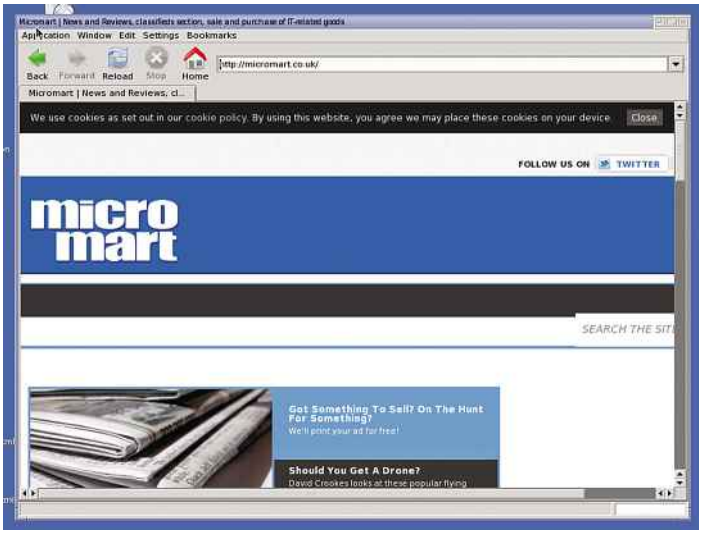
What you get, then, is a capable operating system for basic everyday tasks if you're a truly undemanding user. What you don't get, sadly, is the ability to add your own choice of apps. There simply aren't any beyond those preinstalled. Because of this there's not been any need to create the likes of a package manager. Also missing is support for wireless networking, and although we tested Syllable inside a virtual machine, we'd guess that hardware driver support for other PC components is basic at best.

What struck us most about Syllable is that it looks and feels like a Linux desktop such as Xfce. And if that's the case, then you might as well just use a Linux distro and get a wider range of hardware support to boot, as well as a bigger range of software. At least Haiku, mentioned above, is distinct and unusual in its look and feel, as well as its aims.

None of this should diminish the achievement that is Syllable in its current state. It's just that it lacks anything to make it genuinely appealing or to make it stand out from the crowd. **mm**



***Syllable benefits from Amiga OS inspirations, as well as bits of BeOS, but mostly it looks and feels like a basic Linux desktop***




***Like all the operating systems included in this feature Syllable includes a basic web browser that's based on the evergreen WebKit engine***

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# Remembering...
# The Elder Scrolls IV: Oblivion

## David Hayward goes back to a bit ex-gen sword and sorcery fun

A week or so ago I was clearing out a draw and I came across my copy of *Oblivion*. I hadn't played it in ages, so I popped the disc in the drive and installed it for a quick hour or so of playing. Something like eight hours later I finally stopped and began to realise just how much I enjoyed this game; how pivotal it was in defining the open world genre and how blooming big the game is. Seriously; eight hours in I'd barely scratched the surface.

It may not be all that old, having been released in 2006 – it's certainly the youngest 'Remembering' we've had since we started this page – but I thought it was worth mentioning as gamers now take the first person, open world theme for granted. For me, *Oblivion* fulfilled a strange dream of mine: to be the wandering warrior, sword in hand, who takes on various quests and treads the jewelled thrones of the earth beneath my sandaled feet. Very *Conan*, but it's something I've always wanted to do and through the power of gaming, I finally could.

The low-powered PC I had at the time didn't cope too well with what Bethesda had created, and it wasn't until a couple of upgrades later that I could turn up the graphics to the maximum – even then there were moments of stuttering.

Now, though. my gaming machine is capable of playing anything that's currently available, so running *Oblivion*'s a breeze. Surprisingly, despite the game being nine years old (an age in gaming terms) it still looks magnificent and plays remarkably well.

### History

According to Bethesda Game Studios, work started on *The Elder Scrolls IV: Oblivion* straight after the release of Morrowind. It was a mammoth project, one that would ultimately see the development team create the huge 16 square mile game world of Crodiil, complete with wildlife – that actively hunt each other – generated enemies, mountains, forests, caves, towns, cities, ruins, rivers, lakes and some of the most impressive views imaginable in a game of the time.

Working with 2K Games, the combined development teams used Bethesda's propriety intelligence software, Radiant A.I., along with an enhanced version of the Havok Physics Engine to mould a stunning world. A world where you could stop in a meadow overlooking the coast as the sun begins to dip below the horizon and marvel at the lighting effects and digital beauty. With this and a mix of specular mapping and HDR routines, we could enjoy a world attempted to be as dynamic as the one outside our window. With mixed weather patterns, NPCs that made choices based on their environment, the voice talents of Patrick Stewart, Lynda Carter, Terence Stamp and Sean Bean, a BAFTA winning musical score and some clever game mechanics. *Oblivion* was without a doubt one of the greatest and ambitious games of modern times.

### The Good

Stunning graphics, in a free roaming world. You could finally live those sword and sorcery pulp fantasies.

### The Bad

The occasional glitch, repetitive quests and monologues and often poor load times (in 2006) marred the experience for many.

### Conclusion

*The Elder Scrolls IV: Oblivion* is still a great game and one that certainly set the bar among game developers for many years to come. Fans of the *Elder Scrolls* series have since enjoyed *Skyrim* and *Online*, and there's a card game due out soon called *Legends*. It was *Oblivion* that brought many new players into the world of Tamriel, though.

### Did You Know?

- Although Oblivion is 16 square miles in size, the previous *Elder Scrolls: Daggerfall* game world is actually bigger than Great Britain
- The Horse Armour DLC released later in 2006, was still being purchased in 2012
- Southeast of Bravil, under a bridge, you'll find a dead troll in the water, with a note that reads, "Mee wurst troll evurr. Nobuddy pay brijj tole. Mee nott sceary enuf. mee gett drunc an kil sellf. Troll droun." Poor troll
- Apparently, there's a single unicorn to be in the *Oblivion* world. It can be ridden and used in combat

*One of the many fine views and vistas available to the gamer in Oblivion*

*Oblivion is also where we get the now legendary question: who lights all those torches in the scary, evil caves and dungeons?*

# Component Watch

## You don't need to break the bank to buy a 4K screen...

The price of 4K monitors has been drifting slowly downwards in the last year or so, and it's now possible to get a fairly good selection of high-end, 28" displays for well under £400. In some cases, you can get them for less than £300! But if these monitors represent the budget end of the market, are they actually any good? And just how good are the savings you can find? In this week's Component Watch, we'll help you find out.

**Deal 1: Acer CB280HK**
**RRP: £329.99 / Deal Price: £259.97**

One of, if not the single cheapest 4K monitors around, the Acer CB280HK has built-in speakers and a VESA mount, with DVI, HDMI and DisplayPort inputs, 1md response time and EcoDisplay power saving technologies. Even at this price, it has a 60Hz refresh rate (the earlier monitors didn't), and if the colours are a little off and the brightness isn't entirely even, that's easy to forgive when it's so much cheaper than almost any alternative.
**Where to get it:** CCL – bit.ly/1MobFSR

**Deal 2: AOC U2868PQU**
**RRP: £590.97 / Deal Price: £282.97**

The AOC U2868PQU is slightly more expensive but quite a bit older, though despite this there are no obvious failings. Indeed, it's old enough that it even still has a VGA port (as well as HDMI, DisplayPort and DVI), which is something lots of newer monitors drop, so it might be important enough to you to swing a decision. Again, it's not fantastic, but it does have a 60Hz refresh rate and comes in under £300, so it's ultimately hard to criticise, especially given that it's now less than half price.
**Where to get it:** Laptops Direct – bit.ly/1IiEy0d

**Deal 3: Iiyama B2888UHSU-B1**
**RRP: £534.00 / Deal Price: £331.93**

Once you cross the £300 threshold, things get a little more sophisticated. This 4K Iiyama monitor has two HDMI and DisplayPort inputs in addition to a DVI port, and the built-in speakers also contain microphone and headphone ports, so you never have to crouch under your PC to find the motherboard's native ports again. And if that wasn't enough, it also has two USB 3.0 ports built in. Iiyama's name might not be what it was when it was making the best CRT monitors by far, but this is still a piece of hardware worth paying a little extra for – especially with this discount.
**Where to get it:** CCL – bit.ly/1TPXk2Z

**Deal 4: Philips 288P6LJEB**
**RRP: £383.07 / Deal Price: £337.85**

The Philips 288P6LJEB is a good all-rounder in its category. It doesn't offer the best price or the best performance, but its colours are good, its resolution is sharp and connectivity is fine. Some reviews criticise its viewing angles and awkward touch-buttons, but generally speaking it outperforms any monitor cheaper than it even if the design isn't perfect.
**Where to get it:** Ebuyer – bit.ly/1KkfiZH

**Deal 5: Asus PB287Q**
**RRP: £733.97 / Deal Price: £379.99**

Asus hardware has a generally good reputation, and the original price of this hardware is staggering, which makes it seem like a great deal – but don't be too fooled. It's an old 4K monitor, which is why the discount is so large, and the design is a little awkward especially when it comes to plugging in the cables. But the colour reproduction is good, the connectivity is good, and the image quality is competitive with any other 4K screen. If you can handle a bit of fumbling for sockets, there's no reason to avoid this.
**Where to get it:** Debenhams Plus – bit.ly/1CUSb5o

# Light It Up

# Case Closed For Mid-Tower Seekers

## Water-cooling case from Phanteks

It's always a good time to build yourself a new system, and Overclockers UK has been in touch to tell you about a new case added to its site.

The Enthoo Pro M from Phanteks offers "great design without compromising price". That's the marketing rhetoric, but the actual case delivers water-cooling possibilities thanks to its innovative radiator bracket and pump-mounting locations. This mid-tower case has multiple radiator support, a removable SSD bracket, closed HDD panel and velcro cable management among its many features, all of which are designed to house a mighty gaming build.

Kitted out with three 140mm fans, tool-less side panel with a swing door and bottom and front dust filters, this could be worth a peek.

If you don't like the idea of building a system yourself, though, there's always the ready-made Evolution range. With six models in the pro-gamer range costing from £999.95, there are two distinct line-ups: Wrath, based on AMD graphics and Envy, based on NVidia. They're easy to tell apart, as the Wrath range has a red colour scheme, while Envy comes in green, although you can specify alternative colours if you'd wish. With overclocked speeds up to 4.5GHz, the range is suitable for all gamers but is clearly chiefly for the enthusiasts among you.

Check out these two offerings at **www.overclockers.co.uk**.

**QUICK BITS... iOS game Fallout Shelter has whipped up a frenzy, reportedly bringing in over £3.2m for developer**

## LED strips illuminate your system

Also available from Overclockers are these rather snazzy LED strips from BitFenix that will give your system build that little bit of pizzaz.

The Alchemy 2.0 strips have magnets embedded directly into the LED strip substrate so they're simple to attach to a case. Whether it's a natural-looking white light that you're going for, or a different theme with either red, blue, green or purple strips, these have you covered. They can be daisy chained too.

Head for **www.overclockers.co.uk** if you want some.

# CaseLabs Says Sorry Over Thermaltake Claim

## Facebook post results in full letter of apology

You may have missed this one in the news, so we wanted to bring you the tale of computer case maker CaseLabs and its staff's attack of fellow manufacturer Thermaltake.

It all started when CaseLabs' vice president Kevin Keating posted a note on Facebook accusing Thermaltake of stealing CaseLabs' case designs. This would have been a serious enough matter in itself, but then Legit Reviews brought added attention its way by uploading a pretty detailed post on the situation.

With the Facebook claim now well and truly out in the open, CaseLabs responded quickly by retracting Keating's comments and asking Legit Reviews to take down its coverage that included the original Facebook post. In a statement, CaseLabs noted that it "regrets those statements and apologises for making them" and went on to admit "The look of a computer case will always have some similar features – given its functional nature. CaseLabs retracts its accusations against Thermaltake for 'copying other people's existing concepts and calling them your own' and of producing 'rip-off products'."

This is all a bit embarrassing for CaseLabs, although Thermaltake's CEO has responded saying that the company "appreciates" both the retraction and the apology.

**Bethesda within two weeks of being on sale**

**Windows, Linux and perhaps Mac OS X: if you're a PC user, it's highly likely you're running one of these operating systems.**

**Of course, things being relatively standardised in this way has it advantages. It's easier for developers to get their software to you, and it avoids customer confusion.**

**At the same time, though, it's good to see that there are people working on alternative operating systems, often maintaining or resurrecting software from the past**

**Just how useful these are varies, but it's nice to think that people growing up with today's modern operating systems can get a taste of how things were before Windows rose to prominence.**

**I'm not going to be installing ReactOS any time soon, but I salute those who are working on it.**

**Until next time,**

*Anthony*

**Editor**

# Meanwhile... On The Internet...

Rarely does a week go by when we don't have a hack of one kind or another to muse over. It's more rare that the things we discuss make it on to the pages of the mainstream press, which makes the whole Ashley Madison business all the more noteworthy (**tinyurl.com/MMnet73a**). Of course, it's not the technical side of the matter that the press is interested in – just as the coverage of Celebgate was not about the noted insecurites of Apple's iCloud platform – it was the salacious nature of the service, which was widely used to arrange extra-marital affairs, and the alleged extortion that was what drew the tabloids around the story like flies. Of course, with the sites claims that it has 37 million customers, it was also a good chance that there were a lot of people desperate for any information they could get about the chances of their details being discovered by a spouse or significant other; either now, or sometime in the future.

The news of the breach, apparently undertaken by a group calling itself The Impact Team, originally broke via Brian Krebs' excellent security blog (**tinyurl.com/MMnet73b**) – where he confirmed the breach and reported on samples of information that were turning up across the web – but attracted the attention of mainstream media. For their part, the perpetrators (or perpetrator; a discussion we'll come to later), say that the hack was in response to what they/he/she describe as the 'lie' of the site's 'full delete' feature. That's a service charging $19 to scrub the site of their usage history, profile and identifiable information (despite the fact that, for many users, it can be done for free: **tinyurl.com/MMnet73c**). The Impact Team, however, insists that – despite the feature netting Avid Life Media (Ashley Madison's owners) something like $1.7m last year – even what the firm promises of a full delete is a "complete lie", and that "purchase details are not removed as promised, and include real name and address, which is of course the most important information the users want removed."

Ironically, Avid Life Media is now offering its questionable service free of charge: **tinyurl.com/MMnet73d**. An offer that's much to late to save the blushes of anyone's information that may end up online. Thankfully, though, the mass dump of information threatened by The Impact Team, which would echo an earlier attack upon Adult Friend Finder earlier in the year (**tinyurl.com/MMnet73e**), has not yet materialised at the time of going to press, but you can guarantee that there are a lot of very nervous people out there.

While it's easy to take the high-ground, it bears repeating the real damage this can do to people's lives even though they've not broken any actual laws (**tinyurl.com/MMnet73f**), and could even make collateral damage of people who have nothing to do with the matter whatsoever (**tinyurl.com/MMnet73g**). It's not so easy to feel sorry for those behind Ashley Madison, though, a company that does seem to operate on less-than-fair business model, and which has consistently had to field allegations that it's site's user numbers are padded with fake female profiles. It gets even harder when you consider that it would appear the sensitive information it was storing was not encrypted (**tinyurl.com/MMnet73h**), despite the fact that last year the site was touting itself as "the last truly secure space" online (**tinyurl.com/MMnet73i**). A piece of hubris that will, we suspect, haunt it for the remainder of its life as a viable business; which may not be all that long.

Let's face it: if Jon McAfee is making jokes about you being pwnd by an angry individual ("don't ask me how I know", he states) rather than a group, and noting that your security is still pitiful (**tinyurl.com/MMnet73j**), it's not good is it?

Talking about embarrasing IT mistakes, we really liked the story about the French arm of Universal Pictures, which issued a copyright takedown (**tinyurl.com/MMnet73k**) request to Google for a copy of *Jurassic World* that was hosted on its own servers (**tinyurl.com/MMnet73l**). The request, we're informed, was likely generated by an automated piece of software assigned to hunt for the files online in leiu of a human taking the time and effort, a compromise that is likely the reason such mistakes are quite common these days (**tinyurl.com/MMnet73m**). Good to know that studios are so studious about the takedown requests the seem to throw around so liberally, eh? What could possibly go wrong?

### Aaaaaaaaaand Finally...

We've round up this week with recommendations that you check out the two magicians who trick-bombed a live Sky News report from the Houses of Parliament (**tinyurl.com/MMnet73n**), take a look at this owl who is just chilling out in the sink (**tinyurl.com/MMnet73o**) – as you do – and *finally* finally clap your peepers on quite possibly the funniest use of slow motion photography we've seen in all of our days. Sirs, we salute you (**tinyurl.com/MMnet73p**).

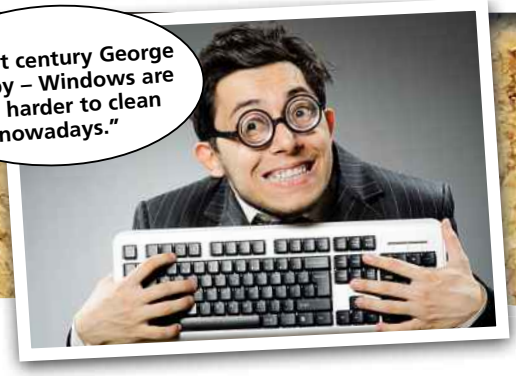
## .AVWhy?

**Videos For Your Eyes... Not Necessarily For Your Brain**

Online film vlogs are now a well established vessel for venting ones fury or love for the movie of your choice, but it's been a while since we've seen anything like the vitriol generated by MovieBob in his very NSFW (language-wise) attack on Adam Sandler's retro gaming nostalgia-fest *Pixels* (**tinyurl.com/MMnet73q**). It's the latest in a increasingly long series of nails being driven into the coffin of Sandler's career by the internet over recent months, though even we're not sure about the comparison with a goat (**tinyurl.com/MMnet73r**)

**QUICK BITS... Spotify is launching a Discover Weekly playlist feature for users that will offer up music suggestions based**

## Caption Competition




The smiley chap you see above these words was the subject of our caption competition back in issue 1371. Here are the best suggestions that came in:

- **JayCeeDee:** "If he went to Specsavers... He shouldn't have!"
- **Thomas Turnbull:** "I do like to do things the hard way like typing while looking in a mirror"
- **Martin Prince:** "You don't have to be mad to like Windows 8, but it helps..."
- **Mad Malc Is Back:** "My you've changed Anthony!"
- **Doctor Yorkie:** "A 21st century George Formby – Windows are a lot harder to clean nowadays."
- **Ondrive:** "I'm smiling like this because I just threw the rest of the system out of the window."
- **Ondrive:** "My keyboard is like a shield of Steel Series!"
- **JayCeeDee:** "Teddy hadn't quite mastered the 'Accordion Player' Sim."
- **Think Tank:** "Check out accordion mode in windows 10."
- **4lingleaves:** "It's of little surprise that Arthur's first foray into the wearables market was a flop... "
- **JayCeeDee:** "No, no, yous can't take itssss – my Prrreeeciousssssss..."

The winner, though, was Doctor Yorkie who offered up: "A 21st century George Formby – Windows are a lot harder to clean nowadays."

To enter this week, head to the 'Other Stuff' section of our forum (**forum.micromart.co.uk**) or email us via **caption@micromart.co.uk** and say something funny (but not too rude) about the picture below.

# Microsoft Releases Anti-Abuse Aid

## Free tool helps to detect images

Microsoft has released a cloud version of a tool to help website owners battle the practice of sharing images of child abuse.

The PhotoDNA tool, which analyses and detects images of abuse, has been made available to help the collective web take on the very real problem of hundreds of thousands of abuse images being uploaded every day. The tool was already being used by major companies including Facebook and Twitter, and this release will now help small businesses identify such images.

# United Airlines Rewards Hackers

## Million miles for pair

Sometimes, hacking does truly pay.

According to media reports, United Airlines has rewarded a couple of hackers with a truly wonderful prize of a million flight miles each in recognition of their work in spotting security holes in its website.

The airline's "bug bounty" scheme encourages hackers to contact it privately with information on security flaws, and this particular reward is its maximum payout on the scheme. United Airlines is far from alone in having such a scheme in place, but this is arguably one of the very best rewards out there. Just imagine all the places they could visit.

An expensive, but probably quite savvy way of making sure that your security problems aren't all out in the open.

# Snippets!

## EDSAC Project Shortlisted For Award

The National Museum of Computing's EDSAC project has been shortlisted for the 2015 Icon Conservation Awards.

The Awards "recognise the highest standards of conservation, research and collections care within the UK art and heritage sectors", and EDSAC deserves its place on the shortlist for the work that the 25-strong volunteer team has put into reconstructing one of the most important early British digital computers.

The eventual winners will be announced at a ceremony in October in London.

## Spam Down!

According to research from security outfit Symantec, we're being sent fewer spam emails than for over a decade.

Less than 50% of emails scanned during June were classified as spam, which is great. Unfortunately, as spam has fallen, new malware variants have risen, so the murky world of online security still has plenty to occupy itself with just yet.

## Trump's Team In Tweeting Trouble

In case you didn't know, the presidential election campaign is well underway across the pond. One of the candidates is a certain Donald Trump, and the team behind his campaign took to Twitter to post a promo photo of their wannabe chosen one.

Unfortunately for him, said photo included imagery of Nazi soldiers that were superimposed onto the US flag alongside a close-up of Trump himself. The mistake, which was very swiftly deleted – although not in time for media outlets to notice – was blamed on an intern.

# CD Ripping Becomes Illegal Again

## U-turn on government's law

Oh dear. In a somewhat farcical turnaround of events, last year's UK law saying that it was actually legal to transfer music from a CD to your home computer or MP3 player has been overturned in the High Court.

Sigh.

The reason for this turnaround is a legal challenge from the Musician's Union, Basca and UK Music, and it just serves to muddy the waters once again for this long-standing, slightly confused issue.

Here's how things stand now. It is once again illegal to transfer any files from a CD or DVD to an MP3 player or computer, even if it is only for personal, private use. The thing is, this is pretty much the very issue that the law that was passed last year was trying to recognise – that ripping CDs for personal use on an MP3 player or computer is a widespread practice and that, as such, the very notion of banning people from doing so stands as a rather archaic, outmoded way of thinking.

No matter, the law has been changed back again whether you like it or not.

# Marshall Mobile Makes Sweet Music?

## Loudest mobile on earth?

With a release that will presumably go all the way up to 11, amplifier manufacturer Marshall has announced the Marshall London smartphone.

Unsurprisingly, music is the key factor of this model, with Marshall claiming that "it might just be the loudest phone on earth" thanks to the two front-facing speakers that mean headphones aren't necessarily needed. The London is available for pre-order now, with delivery due possibly in August.

Capable of crystal-clear playback of lossless FLAC files, the phone features enhanced bass technology, noise reduction and a dedicated HiFi-grade sound card. A couple of stereo jacks mean you can share your tunes with another at different volume levels, and the analogue scroll wheel offers precise noise control. Away from the sound, the Android Lollipop mobile is powered by a 1.2GHz quad-core Qualcomm Snapdragon 410 chip, 16GB storage and a 720p HD Gorilla Glass 3 screen with anti-fingerprint coating. The photos from the 2MP front camera should look decent enough on that.

In truth, the specs of this, outside of its audio capabilities, are hardly ground-breaking, but then Marshall will be hoping that its brand name goes a long way to bringing customers on board. Read more over at **www.marshallheadphones.com**.

**QUICK BITS...** **The Kickstarter campaign for Shenmue III received over $6.3m in funding. Wow**

# Cheerz Celebrates UK Launch

## Blast from the past

It's rather a scary thought that today's youth may well be totally unaware that Polaroid photos used to be quite the thing.

In what's quite possibly a vain attempt to change all that, Cheerz – marketing itself as a "young lifestyle brand – is launching in the UK next month to marry modern Instagram with ancient Polaroid. Yes, with this iOS and Android app you can directly print images from Instagram, social media and smartphones in a Polaroid format.

Fully integrated with all devices, social networks and even Dropbox, Cheerz will apparently allow you to easily select and print images that will be back with you at home within days. It will also, we're told, offer personalisation options that will include a range of background colours and text fonts to suit any occasion. Your Polaroid never did that, eh?

# Go Pro With Xara

## All-in-one graphic design package

Xara would very much like you to know about its Designer Pro X11 package, the latest release for its all-in-one graphic design software.

Xara Designer Pro X11 is Xara's flagship product, a design package providing a host of functionality, including vector illustration, photo editing, page layout and WYSIWYG website design, all in one program. Promising an easier learning curve than most, Designer Pro X11 also boasts higher productivity and lower memory usage because of no program switching. New for this edition is… well quite a lot, actually. Among those features are Web Animation dialogue for new animation capabilities, placing of "sticky" objects on pages, plus online editing in the cloud, with files synced with the likes of Dropbox and Google Drive.

Users can publish to any web hosting provider, while 2GB of free web hosting space is also provided if needs be. Anyone upgrading will have to fork out £65 (new users will be charged £220). Read more at **www.xara.com**.

# Gah! Google Suffers Fresh Bump

## Self-driving accident results in first injury

Google's self-driving cars project has hit another bump in the road, as a blog post by the company has reported that one of its cars had a scrape with another, leading to "minor whiplash" for one of those involved.

The accident happened on 1st July, and it's the first involving one of Google's cars to result in injury. The associated blog post on the crash details that the accident was actually caused by another vehicle rear-ending Google's car: "This certainly seems like the driver was distracted and not watching the road ahead."

Brilliantly, the post then goes on to hail how brilliant Google's cars are, as they haven't been the cause of any of the 14 hits encountered to date: "We'll take all this as a signal that we're starting to compare favorably with human drivers."

# Arkham Knight Fix Coming... In August

## Warner Bros bringing patch for Bats fans

If you're one of the many disgruntled Batman fans left mightily unhappy at the horribly botched PC release of *Arkham Knight*, this news might cheer you up. We said might…

The much lamented PC version of the game was deemed something of a failure upon its release, as consumers reported performance problems aplenty. With Warner Bros and Rocksteady announcing that they would fix the problems in due course, it turns out that "due course" actually means August – with a post on the Steam community site stating that Warner Bros is planning on an interim patch update for release in August.

Whenever the problems are eventually fixed, we fear that the damage may have already been done.

# Salircu Line Interact 700VA SPS ONE Tower UPS

## It's big and red, and without it your PC could be dead

**DETAILS**
- **Price: £70 (Ebuyer)**
- **Manufacturer: Salicru**
- **Website: www.salicru.com**
- **Requirements: Electricity**

Salicru, as was news to me also, is a Spanish business that's been around since 1965 making systems to maintain electrical supply. It makes a wide range of DC converters, voltage stabilisers and Uninterruptable Power Supplies (UPS). The scope of its products is quite amazing, in fact, because at one end it's got the SPS Home range – that starts with a 600VA capacity – and at the other end the SLC Adapt, with the potential for a whopping 900000VA.

It's SPS One series is at the more modest end of that scale; available in 500, 700, 900, 1100, 1500 and 2000VA power ratings. It features USB connection to the PC, and protection for not only the PC but also telephone or internet cabling. Unpacking it, the 700VA review model is a heavy old lump weighing in at 4.25kg – though compared with its 2000VA bigger brother at 11.5KG it's a lightweight.

Salicru, for whatever reason, decided to make the One from a rather distinctive red plastic, that brought back some distant childhood memory of a London bus toy. In terms of features, simplicity is the watchword here. On the front is three LEDs to signal the status and a push on/off button. On the back are three power points for connecting protected equipment: two that are UK three-pin plugs, and another that's on the Kettle lead (IEC) variety. That's enough to hang a PC, monitor and another peripheral onto the UPS but, with just 700VA on tap, that's probably enough.

To charge the unit takes at least four hours, though it can provide some degree of protection during this time, even if it wouldn't last as long if the power dropped while it was recharging. In a simple test I plugged a PC using the Z97 chipset and G3258 Processor in and ran it on Windows 10 preview before pulling the plug. The software, which I'll get to in a moment, shut the PC down after about 30 minutes, though I hadn't got the monitor attached to the UPS. That gives you a reasonable window to shut down a PC in a controlled manner if a power cut occurs, but not any great capacity to do much more than that.

The application Salicru uses is called Viewpower; though it's not in the box, and you're forced to go hunting for it on the Internet. It's a feature-rich tool, though, and even works to manage multiple PCs and their respective UPS across a network.As a web-based application using Adobe Flash, it isn't ideal, though. For a start, it won't work in browsers that refuse to use that plugin.

From a price perspective, Salicru have pitched this around a fiver less than a comparable APC Backup-UPS, though I found cheaper options – from Cyberpower, among others. While this unit currently comes with free delivery from Ebuyer, I do wonder if someone buying a UPS might want something of higher quality construction, even if those aspects are skin deep.

**mm Mark Pickavance**

### Features
- Line-interactive technology
- Microprocessor control guaranteeing high reliability
- AVR Boost&Buck permanent stabilisation
- USB interface for all models as standard
- Downloadable monitoring software for Windows, Linux, Unix and Mac
- Protection for data line / telephone / Internet
- A single on/off switch for easier and more convenient use
- Protection from overloads, short circuits and transients
- Smart battery charger to shorten average recharging times
- Battery recharging with equipment turned off
- Battery-powered cold-start function
- Automatic restart when input voltage restored
- SLC Greenergy solution

### A UPS that does the job, though not elegantly

# SP3600DN

## Forgoing colour, Michael Fereday checks out a mono laser printer

**DETAILS**
- Price: £321 RRP (although Amazon currently lists it at £175)
- Manufacturer: Ricoh
- Website: www.ricoh.co.uk
- Requirements: Any system running Windows XP or Mac OS X 10.6 and later.

The Ricoh SP3600DN is a mono laser printer that has been developed to replace the company's SP3500N, SP364510DN and SP4100DN models. As you might suppose the 'DN' section of the product's model number refers to the fact that this printer has duplex and network capabilities.

Forming the base of the unit is a pull-out paper tray with a capacity of 250 sheets. This drawer has a front-mounted handle grip for easy removal when paper filling is required. To help with this task, the drawer has an elongated window on the left so you can check on the paper situation without opening the drawer. There is also a small wheel device on the right side of the drawer that can be set to show the size of paper currently being used for printing.

There is a second paper input tray revealed when you lower a flap at the front of the unit. This tray is mainly for odd sizes of paper or envelopes and has a capacity of 100 sheets. Printed documents are ejected from the top of the printer into a recessed area that has a pull-out flap to help keep the documents under some sort of control.

Sitting along the paper output area is the printer's control panel. This does tend to stand out due to its black colour and it being slightly raised above the body of the printer. The control panel features a 60 x 25mm LCD screen for feedback purposes plus a navigation wheel, selection options and LED indicators for power, alert and data reception.

If, for any reason, you need to gain access to the printer's insides, such as replacing the toner cartridge or drum, then there is a button on the right side of the printer's body. When pressed, this button will release the front of the printer and give you access to this area. You might also need to gain access in the case of a paper jam, which happened to me during my first print run.

When this occurs, the control panel screen displays instruction as how best to proceed. These instructions include opening the front and rear panels, removing a blocking component and any recalcitrant paper. Replacing the rear component proved to be tricky, but fortunately this was just a one-off occurrence.

There are a number of pre-set settings for different types of print runs, including the default job that insists on duplex printing. There is an option to select a one-sided print setting – or you could go the whole hog and create your own print job with specific settings that include paper sizes, orientation, finishing, effects (watermark etc.) and print quality. With the latter you have a choice of 600 x 600 or 1200 x 1200dpi. My aging eyes were unable to detect any difference between the two, and print speeds were also the same as I achieved 30ppm when printing an 830-word document using both settings.

Replacement cartridges are available as Standard or High Yield, with the former (rated at 3000 pages) costing around £58, and the latter (6000 pages) currently available priced at around £67.

mm **Michael Fereday**

***Better suited to a small office environment rather than for home use***

# Lenovo ThinkCentre M73 Tiny Desktop

## Lenovo's new office PC doesn't need any floor space to deploy

**DETAILS**
- **Price: £446.49**
- **Manufacturer: Lenovo**
- **Website: shop.lenovo.com/gb/en/desktops/thinkcentre/m-series-tiny/m73/**
- **Requirements: VGA or DisplayPort monitor**
- **Part No: 10AY003WUK**

Having seen plenty of amazingly small PCs in the past few years, my first reaction to Lenonvo's ThinkCentre M73 Tiny Desktop is that it isn't the smallest PC I've seen. However, compared with a standard ATX case, the M73 Tiny is small enough to be VESA mounted to a monitor, or placed out of view on the side or back of a desk.

The chassis measures 338 x 385 x 100mm, and inside that chassis is kit to fulfil the requirements for typical office computing tasks using the Windows platform. Out of the box you get the diminutive machine, mouse and keyboard – so you need either a VGA or DisplayPort monitor to make it fully operational. Lenovo has pre-installed Windows 7 Pro 64-bit by downgrading from Windows 8.1 Pro, should you ever wish to embrace that platform.

What's inside the M73 can vary rather wildly depending on how much cash you part with. The review machine used a reasonably powerful 3GHz Core i3-4150T Processor, 4GB of DDR3 memory and a 500GB hybrid drive. Lenovo offers a wide range of customisations, though, that can take this machine all the way up to a Core i7-4785T processor, 16GB of RAM and 1TB of storage. They also offer SSD drives, though curiously only up to 256GB in size.

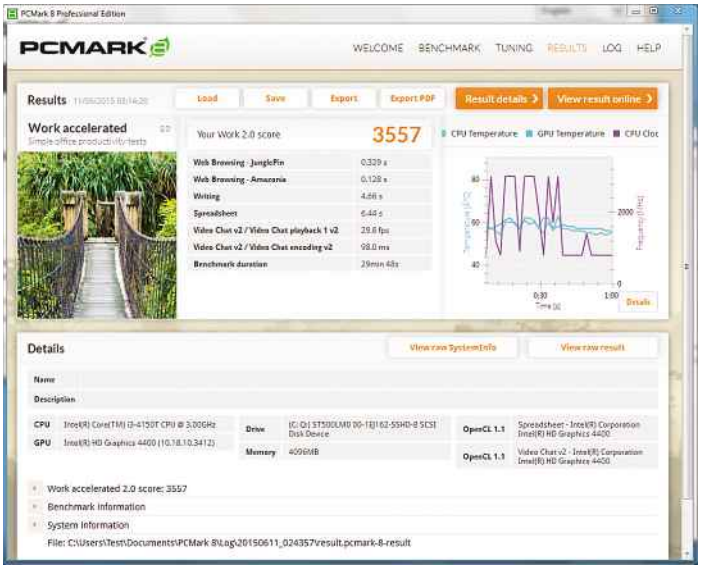
The cheapest version uses a Celeron G1840T CPU, 4GB of RAM and a 320GB hard drive, and is available for just £294. That's a very competitive price when you consider that it includes Windows – with a potential upgrade to version 10 by default.

Those thinking of potential hardware upgrades to RAM or storage are warned off by a large red sticker that Lenovo placed on a case seam marked 'Seal Sticker – DO NOT REMOVE'. There was me thinking that thinking like that went the out with the Dodo, but apparently not at Lenovo. Beyond the warranty invalidating sticker there are probably some upgrade options, I'd guess.

Continuing the days-of-computing-past theme, Lenovo also kindly pre-crapped the machine with all manner of software detritus including the truly insidious Norton Security – an antivirus product that's first job is to inform you that your PC is defenceless, before a rapid segue into how you should pay them to better control this panic-inducing tool. My advice would be to remove it immediately and put something free on before it gets too comfortable, ignoring its protestations.

The M73 generally works much better once this software is replaced with an alternative, and further improvements can be gained by deleting some of the other entirely superfluous items that aren't part of Windows by default. Once fully decluttered, the performance of this machine is very impressive given its relative diminutive size and a cooling system that's mostly passive. The metal case can get warm when it's been worked hard, but not worryingly so.

The external power block is one of Lenovo's 'New Power' Energy Start 5.2-rated products




**Features**
- Intel Core i3-4150T Processor( 3.00GHz, 1600MHz, 3MB)
- Windows 7 Professional 64 pre-installed (through downgrade rights in Windows 8.1 Pro 64)
- 4.0GB DDR3 1600 MHz
- 500GB + 8GB 5400 rpm hard drive
- Intel 7260 b/g/n Wireless (2x2 BGN)
- Bluetooth Version 4.0
- Three-year warranty
- USB Optical Mouse and Keyboard included

> **A very serviceable piece of equipment that would work well in many offices**

that it's using on the ThinkPad line, and it generates the 65 watts, more than the M73 Tiny could conceivably use.

It scored a very respectable 3557 in the PCMark 8 Work 2.0 test, slightly above a mobile Core i5-4200 laptop I recently tested for the magazine. Unless you're a software developer or database cruncher, then this is great performance – and more than adequate for day-to-day work and web tasks. It's never going to be the choice of hardcore gamers, but that's not the market that Lenovo are targeting here.

The strengths of this design is that Lenovo will provide it with Windows 7, what businesses actually want, and the machine is appropriately toughened for the rigors of office user. Metal trumps plastic in this respect; always. My only reservations about this hardware design are the video port selections, where Lenovo gave it DisplayPort instead of either DVI or HDMI. That makes little obvious sense in a business context, as DisplayPort isn't a technology that has pervaded general office use.

Other than that point, this is a very serviceable piece of equipment that would work well in many offices that aren't spacious enough to entertain floor standing computers. Indeed, deploying ten of these to the top floor of an office would require much less physical effort than an equivalent full desktop solution.

As I expected, Lenovo delivers a price-sensitive solution with M73 Tiny Desktop that many IT departments will see great value in using.

**mm Mark Pickavance**

### *A tough little box of Office PC power*

# HomeMonitor HD Pro Outdoor Security Camera

## Protect access to your home from the outside

**DETAILS**
- **Price: £200**
- **Manufacturer: Y-CAM**
- **Website: www.homemonitor.me**
- **Requirements: 1GHz processor with 512MB of RAM with IE7, Chrome 16, Firefox 8 or Safari 5 plus iOS 5.0 or Android 2.3.1**

Developed by Y-CAM, the HomeMonitor HD Pro Outdoor Security Camera (model HMHDE05) offers to provide your home with a degree of security. This kit comes with the claim of being the only camera that stores the seven days footage in the cloud for free with no subscription required. The main camera unit, which does need to be wall-mounted in an appropriate position, comes with the required wall mount, screws, rawl plugs and tools for attaching the kit. Included in the box are an Ethernet cable, power lead with various adapter plugs, a wi-fi antenna and Quick Start guide.

The camera, rated at IP66 for waterproofing and weatherproofing purposes, is white in colour with a cylindrical shape. Emerging from the base of the unit is the power lead. The camera has a ¼" CMOS 'FarFocus' lens that can deliver HD720 content at a resolution of 1280 x 720 pixels with H.264 compression. Arranged around the front of the camera are 24 infrared LEDs which come into their own during pitch black conditions as they enable the camera to pick up activity at a distance of 10 metres.

While the camera, with the addition of a supplied antenna, will support wireless connectivity, in common with certain printers this device requires an initial Ethernet connection prior to the wi-fi link being established. As part of the initial process you will need to create a HomeMonitor account before moving to wi-fi. When creating this account, which requires a username, password, email address and camera ID, I did encounter a problem. According to the supplied instructions, the camera ID is meant to be on the back of the camera but I was unable to locate it there. Fortunately the ID was on the front cover of the quick start guide.

Before switching to a wi-fi connection, you will need to screw the supplied antenna to the camera. This task requires the removal of a small silver cap to reveal the screw access point for the antenna. With a wi-fi link you can assign an appropriate name, select the relevant time zone and view a live feed enabling you to set up two prime areas that are covered by the camera's motion detection feature.

It is advisable to experiment a little with the positioning of the camera in its outside location before deciding where to fix the camera mount permanently. There are a number of factors to be considered, not least the possible movement of children and pets that could cause accidental or false alerts. With outside locations you also need to take into account the effect that reflections from moving cars and direct sunlight could have on the camera in certain circumstances.

The output can be monitored using the HomeMonitor website or via downloadable apps are for iOS, Android and Roku platforms. With these various means of access, your HomeMonitor account will provide live viewing with unlimited downloads from content stored for a period of seven days and alerts regarding detected events. An option is available to increase the storage period to 30-days with an annual subscription of £30.

Image quality is reasonable, especially in daytime, but I can't say whether this standard would be acceptable as evidence in any legal cases that might arise from captured content.

**mm Michael Fereday**

**Adds an extra layer of security to your home's protection**

# Xebec Tech Sniper

## Another low cost mouse enters our sights

**DETAILS**
- **Price: £12 via Amazon, £10 via Beyond Technologies**
- **Manufacturer: Xebec Tech**
- **Website: goo.gl/f7dpjZ**
- **Requirements: Windows XP+, Mac OS X, USB port, optical drive for CD drivers and control panel**

We've already had a Xebec Tech product through our door before, its Samurai Gaming Mouse, which turned out to be an exceptionally good gaming mouse for an unbelievably low price. Now it's the turn of another mouse, the Sniper; a six-button mouse that differs significantly from its gaming sibling. Rather than having the wide grip, splayed sides of the Samurai, the Sniper is a more streamlined, lightweight and narrow peripheral.

It has a rubberised finish throughout, with brief splashes of colour from the internal LEDs at the wheel and two small points at the bottom of the palm rest. Being narrower makes it a more universal mouse to get to grips with, pun intended. Smaller hands can get a reasonably comfortable hold of the mouse as well as most adults, although those with bigger hands may find it a little too narrow for longer periods of use.

The design isn't too bad; all black, but with an odd rubberised metallic looking section across the palm rest, which resembled the kind of metal you'll find on walkways and gangplanks. It's not too distracting (you'll have your hand over it while in use), just a curious design decision.

*The Xebec Sniper looks quite dashing, but there are some issues*

Five of the six buttons are programmable using the included control panel software, the sixth being the hardware button to select the dpi settings (that range from 800 to 3200) in various increments. You can also change the colour of the LED, and assign each macro to a button across four different profiles. Basically the control panel is the same across the Xebec mouse range, just with a different image of the corresponding mouse taking centre stage in the screen.

While the specs are good for the Sniper, with an Avago 5050 optical laser sensor, 1.8m braided USB cable, and a set of balanced weights that bring the mouse to a lighter than normal 259g, there is one element we just can't grow to love. The mouse buttons are soft touch, including the two main left and right buttons. While some people don't mind a soft button press, we did find it extremely annoying. Furthermore, the two side-mounted forward and back buttons had a lot of travel in them and, at times, didn't feel like they'd activated at all, even when pressed in quite hard.

It's a shame that the buttons don't quite come up to the same standard as the rest of the design, or that of the Xebec Samurai. However, the redeeming feature here is the fact this mouse is available from Beyond Technologies for a mere £10, or from Amazon for £12.

Although very cheap, it does cause a bit of an issue for the Sniper. The Xebec Samurai, which we've conveyed as being a far better mouse, costs exactly the same – from both suppliers. Even with the gaming bent on the Samurai, there's little reason then to opt for the slightly poorer developed Sniper.

*It's quite narrow, but the main problem is with the poor choice of mouse buttons*

Despite the negativity we're showing toward the buttons on the Sniper, it's not all that bad. For less than a tenner it's more than adequate as an external mouse for a laptop or something similar. To be honest, we can't see it being too comfortable over longer periods of use.

In short then, if you're in need of a new, cheap mouse, then we would recommend you go for the Xebec Samurai over the Sniper.

mm **David Hayward**

***A cheaper alternative mouse, but one with rather poor button designs***

# Speedlink Kudos Z-9

## Anthony looks at a mouse that piles on the features

**DETAILS**
- **Price: £50**
- **Manufacturer: Speedlink**
- **Website: www.speedlink.com**
- **Requirements: USB port, Windows XP or later for software**

If you take PC gaming seriously, then the Speedlink Kudos Z-9 is aimed firmly at you. Packed with features, this mouse promises precision and the plenty of customisation features. As you can see from the photos, the Kudos has a shape that clearly defines it as a right-handed mouse, with a thumb support on the left that also includes much-appreciated browser navigation buttons.

This shapes makes the mouse comfortable to use for most people, but those of you with larger hands might find the body of the Kudos to be a bit a too small.

Big hands or small, though, as you move the mouse around, you'll also notice how light it is, and because there's no weight system, you're stuck with this. Of course, if you prefer a lightweight mouse, then it's perfect, but if not, the Kudos's lack of mass could a deal-breaker.

Assuming you prefer a lighter rodent, though (or just don't care), the Kudos has a lot going for it.

The maximum sensitivity of the laser is an impressive 8200dpi, but you can switch between four different settings using the dedicated button on the mouse. This is fully adjustable in the included software package, and the dpi indicator lights on the top of the body let you know which setting you currently have activated.

Speaking of the software, this allows you to customise all manner of things about the Kudos Z-9, including what each of the seven programmable buttons do, the sensitivity, the USB polling rate and even the colour of the light-up strip across its middle

Also, you can switch between different profiles using another dedicated button, and each of these can have its own dpi settings and custom buttons (all set up through the software).

But what if you take your mouse away from your computer? Well, in that case, your settings will still be saved, because the Kudos Z-9 has built-in memory, so all your settings will travel with you, wherever you go.

Add to this a scroll with left and right tilt and a corded cable, and you have a mouse that is fully deserving of a premium price.

> **"An adjustable weight system really should have been included"**

However, whether that price should be 50 quid is another matter entirely. Yes, the Kudos is a good gaming mouse, but for this price, an adjustable weight system really should have been included.

Also, when you install the software, there's an option to also install something called Simplicheck, with no explanation of what this is. This is made by a company called Simplitec, and what it does, apparently, is search your computer for 'problems' before then recommending Simplitec products to fix them. We can't comment on the quality of this software or what kind of deal Speedlink has with this firm, but we can say we don't appreciate its presence when installing mouse software.

These small problems aside, though, the Kudos Z-9 is a gaming mouse that's swimming in features and which we wholly recommend.

**mm Anthony Enticknap**

### A high-quality mouse but not cheap

# Speedlink Ledos Gaming Mouse

## Is this budget gaming mouse actually worth it?

**DETAILS**
- **Price: £18**
- **Manufacturer: Speedlink**
- **Website: www.speedlink.com**
- **Requirements: USB port**

How much did your last mouse cost? £10? £15, perhaps. Or maybe you got yourself something in the region of 50 quid?

Whatever you paid, it was quite likely defined by what you use your computer for. Yes, you can get high-end mice for office work, but the fact remains you can get one for a tenner that does everything you need and is comfortable to use.

If you're a gamer, though, then you probably want something a bit more advanced – features like adjustable sensitivity, switchable on-board profiles and dedicated software for things like macro settings. These are the kind of things that make a mouse worth spending more on.

What, then, can we possibly expect from a gaming mouse that only costs £18? Well, if we take the Speedlink Ledos as an example, then not a lot.

First things first. It's a five-button mouse, and it looks fantastic, adopting a standard symmetrical shape, but with slightly recessed areas at the side for your thumb, ring finger and pinky. Then, when you first plug it in, it immediately lights up around the sides and the top, and this glow then begins to pulse on and off. Set against the black plastic of the mouse, it looks the business.

And then you realise you can't turn it off, and you start to see where the corners have been cut to bring the Ledos in under £20.

Like most gaming mice, it has a button to adjust the sensitivity, but unlike more expensive products, the Ledos doesn't offer customisable settings via hardware or software. Instead you get three built-in presets of 500, 2000 and 3000dpi. For such a low price, though, that seems like a reasonable compromise. What's less forgivable is the fact there's no way to see which dpi setting you're on, apart from moving the mouse around and guessing.

But even worse is the omission of browser navigation buttons. Even gamers use their computers for things other than playing, and being able to go backwards and forwards between web pages should be considered a standard feature of any mouse, no matter who it's aimed at.

So what are those five buttons that Speedlink boasts of? Well, they consist of the left and right buttons, the dpi button (or perhaps the scrollwheel click) and two buttons placed at the sides of the Ledos. On the left, there's a sniper button, which reduces the sensitivity of the mouse to 500dpi for as long as the button is held. This actually works well and could be genuinely useful in a sniper game, but it would have been nice to have an option to use this button for something else.

On the right side of the Ledos is what Speedlink refers to as a "High-rate rapid-fire button". Sound exciting, right? Sadly, it's anything but. In reality, all this does is perform a double left click and probably not as quickly as you could do it yourself. It's also awkwardly placed, further reducing its usefulness. It is, to be blunt, a complete waste of time and plastic.

The Ledo itself, though, in spite of its problems isn't terrible. It's comfortable to use, and it comes with a strong, 1.8m braided cable. And if you prefer a heavier mouse, you'll appreciate its weightiness.

Unfortunately, none of that is enough to make up for the lack of gaming features and navigation buttons, which leave it as an odd product that is neither suitable for serious gaming or productivity duties. The extra features it has are interesting but ultimately little more than novelties, meaning there's no compelling reason to buy the Ledos. In short, avoid. **mm**

**Anthony Enticknap**

***Cutting corners is fine, but this mouse cuts the wrong ones***

# GROUP TEST

## 10.1" Tablets

**10.1" tablets have come a long way in such a short amount of time. Their performance, battery life and price have altered significantly over the last few years, so what's available these days?**

**We had David Hayward look at six, from the many available, to see what they're made of.**



## Linx 10

**DETAILS**
- **Price: £150**
- **Manufacturer: Linx**
- **Website: goo.gl/efntX0**
- **Requirements: Windows 8.1 account, sign up for Office 365**

The Linx range of tablets has taken the online markets by storm in recent months. These low-cost, but pretty decent specification tablets certainly have a lot going for them, with the Linx 7, Linx 8 and Linx 10 models all boasting Windows 8.1, an Office 365 subscription and good hardware throughout.

The Linx 10 model we have for review in this instance is the top of the product range. It has a 10.1" ten-point capacitive multi-touch IPS LCD screen, with a resolution of 1280 x 800. An Intel Atom Z3735F quad-core processor running at 1.3GHz with a boost speed of 1.83GHz is lively enough. Plus there's 2GB of DDR3L memory and 32GB eMMC storage, on which you'll find Windows 8.1.

You'll also find a front and rear pair of 2MP cameras, 802.11 a/b/g/n wi-fi, Bluetooth 4.0, a mini-HDMI port, a single micro-USB port and a micro-SD card slot with support for up to 64GB cards and the power port (note: the Linx 10 can't be charged via the micro-USB port).

The design of the Linx 10 is good enough for most users; it probably won't win any design awards, but it's perfectly fine for a variety of tasks. It measures 172 x 258 x 10.5mm and weighs a reasonable 600g, which makes it borderline light enough to be held as an ebook reader for a while before muscle cramp starts to set in.

The screen is clear and very responsive. Windows 8.1 works very well indeed, and you can skip through the various tiles and other GUI enhancements without too much difficulty. Thankfully, the Atom Z3735F is powerful enough to give the Linx a much needed boost in performance (incidentally, it's the same processor used in the Intel Compute Stick and other USB-sized micro PCs).

Naturally, the Linx 10 won't cope with a modern game or more intensive computing tasks, for that matter, but for browsing, working on, watching videos and light photo work, it's more than capable. The added benefit is the fact that the processor used is x86 based, which means anything you can install on your desktop PC you'll be able to install on the Linx 10 – such as VLC Media Player, Firefox, Chrome and so on.

The popularity of the Linx range, though, is mainly due to the low pricing. The Linx 10 costs in the region of £150, which is pretty good considering you're getting a good tablet, a years' subscription to Office 365 and a micro-USB to full-sized USB cable in the box. If you also factor in the Linx Origami Case, which docks with the Linx 10 and also features a touchpad and laptop style keyboard, for around £25, then you've got yourself a great little setup.

The Linx 10 is a surprisingly good 10.1" Windows 8.1 tablet. It's quick enough for tablet-like duties and has a good display. Battery life lasted for well over nine hours on a full charge in a work environment, and provided you don't try to run something that's obviously beyond the capabilities of the hardware, it'll suffice.

*The Linx 10 is a very capable Windows 8.1 tablet*

*The origami case and keyboard is a good buy too*

# Hannspree Hannspad 10.1

**DETAILS**
- **Price: £100**
- **Manufacturer: Hannspree**
- **Website: goo.gl/m2DuMc**
- **Requirements: Google account**

Coming in even cheaper than the previously reviewed Linx 10, the £100 Hannspree Hannspad looks like it might be the best value Android tablet on the market. Or is it?

This 10.1" tablet with an IPS LED screen has a maximum resolution of 1280 x 800, a quad-core ARM Cortex-A9 1.3GHz processor, 1GB of memory, and 16GB of NAND flash storage with Android 4.4 KitKat installed.

In addition to the above, you also get 802.11 b/g/n wi-fi, Bluetooth 4.0, a front 0.3MP camera and 2MP front camera. Connectivity is standard, with micro-USB, mini-HDMI, a micro-SD card slot with support for up to 32GB cards, and there's also the usual G-Sensor and three-axis accelerometer.

The Hannspad measures 179.9 x 9.8 x 263mm and weighs around 620g. It doesn't feel too heavy and could be used as an e-reader but probably not for long. However, it's reasonably well built, with a brushed metal finish and not too cheap feeling plastic surrounding the screen and outer rim of the case.

On paper, it all sounds pretty good, but the problems arise once you power it on. For whatever reason, the Hannspad is incredibly slow. The home screen struggles to display properly, and swiping around the tablet reduces it to a series of stutters and short freezes. If you then take to having several apps loaded at the same time, the tablet goes into meltdown and takes even longer to respond.

*The Hannspree Hannspad 10.1 isn't a very good tablet*

*The brushed metal on the back cover looks good, but poor performance and battery life mar this tablet*

> **"Swiping around the tablet reduces it to a series of stutters and short freezes"**

It's a little odd, to be honest, as the specifications should be generally okay. Fair enough, 2GB would be a far better choice for Android 4.4, and there doesn't seem to be much extra added onto the OS from Hannspree. In fact, there were a few members of the Android cast missing, such as Google Music and Chrome.

As well as the poor performance, the battery life is also pretty dire. We only managed a meagre four and a half hours off a full charge when using the tablet for basic office duties, with a few non-intensive games thrown in for good measure.

Despite the terrible battery life and performance, the Hannspad screen looked really quite good. Images were bright and clear, and text was perfectly readable. We'd like to say the same for video, but the stuttering was simply too bad to watch anything.

The Hannspree Hannspad may well only cost £99, probably even cheaper if you shop around, but considering the problems we had, it's probably not worth the expense. Of course, those problems could just have been with the model we had for testing, and not something that's inherent with the entire range. In that case we recommend you try to take one for a test drive before committing to buying it.

Otherwise, the Hannspad is just too painfully slow and has an awful battery life. It's worth spending a little more for a better model.

# Lenovo ThinkPad 10

**DETAILS**
- **Price: £700**
- **Manufacturer: Lenovo**
- **Website: goo.gl/ZNdTIJ**
- **Requirements: Windows 8.1 account, lots of money**

*The Lenovo ThinkPad 10 is a remarkable tablet*

*It's just a pity it costs so much*

This entry is a little different from the last couple we've already looked at, in that with it being a Lenovo product it's more business focused than consumer. However, it's still available to the public and therefore it can be included with the other examples in this tablet group.

The ThinkPad 10 has a fairly impressive specification. The 10.1" WUXGA IPS multi-touch screen has a maximum resolution of 1920 x 1200, and the Intel Atom Z3795 processor running at 1.59GHz far outperforms the other examples we've looked at so far. There's also an outstanding 4GB of PC3-8500 DDR3 memory, and 128GB eMMC of storage with Windows 8.1 Pro 64-bit edition pre-installed.

As you can see then, the ThinkPad 10 is a cut above the rest, and it doesn't stop there either. There's a front 2MP camera accompanied by a rear 8MP camera, both with green LEDs and auto-focus. 802.11 a/b/g/n wi-fi, Bluetooth 4.0, mini-HDMI, full-sized USB 2.0 and a micro-SD card complete the connectivity. There's also a digital pen that slides out from a recessed area.

The build quality of the Lenovo ThinkPad is superb. The Gorilla-glass front with matte-black surround and rear casing is superb to hold and view. It's light too, only weighing 590g, and it measures 256 x 177 x 8.95mm, so it's pretty slim as well.

As far as performance is concerned, the ThinkPad takes nearly everything you can throw at it on the chin. It's fast, incredibly responsive and as good a work PC as any laptop. The battery life is excellent too, with our model lasting just shy of ten hours off a full charge.

Although the specifications are extremely good, as is the design and 'feel' of the tablet, the obvious point left to consider is just how much all of this costs. Sadly, the Lenovo ThinkPad 10 isn't the sort of casual tablet most of us would happily chuck to the side of the sofa. At around £700 it's by far the most expensive tablet we've ever had in our hands, so we were extremely careful with it.

Naturally this is the business side of things taking over, in terms of the pricing and specifications. Still, £700 is a lot of money for a tablet, even if you're a business. For that amount you're more likely to give your employee a laptop instead of a tablet.

Regardless of the price though, this is an exceptional 10.1" tablet. If you happen to be a millionaire, then there's a good chance you'll want a Windows 8.1 tablet that can match a desktop, and this will do nicely. Otherwise, it's something we can only dream about and pick up in a few years' time as a refurb model for several hundred pound less.

# Samsung Galaxy Note 10.1

**DETAILS**
- **Price: £350**
- **Manufacturer: Samsung**
- **Website: goo.gl/JXKhDE**
- **Requirements: Google account, Samsung account for pre-installed extra apps**

*The Samsung Galaxy Note 10.1 is still available to buy, despite its age*

*The odd design with faux leather look and fake stitching around the edges*

The Samsung Galaxy Note 10.1 tablet has been a firm favourite of consumers for some years now. It was, toward the end of 2013, the Samsung flagship tablet, but nowadays the Tab A and Tab S models have taken over with better hardware and offering more for the consumer.

The Galaxy Note 10.1, however, is still available, which is impressive considering it's placed in a market that changes so rapidly. The 10.1" WXGA TFT screen with a maximum resolution of 1280 x 800 still looks good, and the ARM Cortex A9 quad-core processor running at 1.4GHz together with 2GB of memory is capable of running the installed Android 4.0 Ice Cream Sandwich well enough.

The Galaxy Note 10.1 also includes a pair of cameras: 1.9MP at the front and 5MP at the rear. There's Bluetooth 4.0, 802.11 a/b/g/n wi-fi, mini-HDMI, micro-USB and a micro-SD card slot supporting cards up to 64GB. Tucked into one corner is the Samsung S-Pen, which pulls out and activates the pre-installed Samsung handwriting features, as well as a few other apps.

It measures 262 x 180 x 8.9mm and weighs around 620g, with a slight variation depending on the model and when it was released – from August 2012 to around mid-June 2014. It's a big enough tablet for viewing the internet, video and images, but it's slightly too heavy for long-term holding in a reading position.

The design of the Galaxy Note 10.1 is generally good. The older model we have has a couple of knocks to the rounded edges, but it's still going strong. These earlier models, though, have a cheapish white plastic cover throughout, which despite being tough don't really lend it the look of quality. The later 2014 models have a strange leather-esque rear casing, which is actually just white textured plastic made to look like leather – even with fake stitching around the edges. It's certainly an odd design decision from Samsung.

The performance is good, though. Android 4.0 breezes along without any stuttering or significant slowdowns. Gaming on the Galaxy Note is good too: it can play nearly anything available in the Play store without too much trouble.

The battery life isn't brilliant: we managed to get six and a half hours off a full charge in our tests, and even less when we added more gaming. At home this won't be too much of an problem, but when commuting or working out and about you'll need to consider stopping off for a quick recharge.

The Samsung Galaxy Note 10.1 is still going strong, then, and is still of use, even in this ever accelerating market. It's unfortunate, however, that it's still priced much higher than most other tablets available these days, some of which are actually better.

# Archos 101 Oxygen

**DETAILS**
- Price: £169
- Manufacturer: Archos
- Website: goo.gl/LbEleF
- Requirements: Google account

We reviewed the Archos 101 Oxygen just a few weeks ago, and while good, we thought we'd see how it fared when compared to other similar 10.1" tablets currently available.

The Archos 101 Oxygen is a remarkably slim and lightweight 10.1" tablet that boasts a full HD IPS ten-point multi-touch screen, a 1.8GHz quad-core Rockchip RK 3288 ARM A17 processor, a Mali T764 quad-core GPU, 2GB of memory and 16GB of internal storage with Android 4.4.4 KitKat installed.

In addition, there's a micro-SD card slot with support for up to 64GB cards, a rear 5MP 1080p video camera, a front 2MP camera, USB OTG port, micro-HDMI, micro-USB, Bluetooth, GPS, and a surprisingly good set of dual speakers.

Compared to the other examples we've looked at so far, with the exception of the super-expensive Lenovo, the Oxygen 101 is really very good. The raised, metallic power button on the right-hand corner is conveniently placed, as too are the volume rocker and connection port along the top of the tablet – with the headphone port located on the opposite corner of the power button. The rear of the tablet is metal, which gives it more weight while greatly improving the quality and the feel of the tablet. The outer edges, though, are plastic, but tough enough to withstand knocks and without compromising on the overall aesthetics. It measures 172 x 240 x 10mm and weighs just 570g, making it better for holding in a reading position for a length of time.

*The Archos 101 Oxygen is a great Android tablet*

*Plenty of performance and at a good price too*

The performance of the Oxygen 101 was something we really liked the first time around, and when compared to the others on test, we were again impressed by how well it fared. When put up against the Hannspree, there was no competition: the Archos 101 cleaned the floor with it. Even up against the Galaxy Note 10.1 the Archos 101 outshone and outperformed it. It could be deemed a little unfair to match it against a Windows 8.1 tablet, however.

The battery life was originally measured at six and a half hours, which in this group is toward the lower end of the scale. As with the Galaxy, though, if you're at home, it shouldn't be too much of a concern, but as we mentioned, if you're out and about you may need to make plans to stop off for a recharge.

The 101 Oxygen is set to cost £169 or thereabouts, which makes it a far more appealing tablet compared to the Galaxy. And even with it costing more than the Hannspree model, the performance difference is huge in favour of the Oxygen.

Overall, the Archos 101 Oxygen is one to keep an eye out for. On its own it did well in a review, and when matched with other tablets it still manages to keep pace. If you're thinking of investing in an Android tablet in the near future, then check it out.

# Sony Xperia Z2 tablet

**DETAILS**
- **Price: £329**
- **Manufacturer: Sony**
- **Website: goo.gl/7zaNxs**
- **Requirements: Google account, hot soapy bath**

*▲ The Sony Xperia Z2 tablet is a fast, well designed and built tablet*

*◀ And we love that we can use in the bath. It's the little things that we enjoy*

A couple of years ago, Sony launched the Xperia Tablet Z, a very powerful, slim and lightweight 10" tablet that was ahead of its time. Since then, the Xperia range has grown to include the Tablet S, Z2 (which we're reviewing now), Z3 Compact and the top-of-the-range Z4.

Clearly, the Xperia range is here to stay, and it's not difficult to see why. The 10.1" IPS screen has a maximum resolution of 1920 x 1200 and features the coveted TriLuminos display engine for great clarity and colours. Added to that is the quad-core Snapdragon 801 processor running at an impressive 2.3GHz, and a huge 3GB of memory. It's available in 16GB or 32GB models, with Android 5.0 Lollipop installed.

Furthermore the Xperia Z2 tablet features a rear 8.1MP camera, along with a front 2.2MP camera, NFC, Bluetooth 4.0, micro-USB, mini-HDMI, MHL and 802.11 a/b/g/n/ac.

The Xperia, though, isn't just a tablet with one of the most powerful mobile processors and a huge lump of RAM installed. This model has an interesting trick up its sleeve.

This 266 x 172 x 6.4mm, 439g tablet is exceptionally light and can be held comfortably in one hand when reading – even in the bath. Indeed, Sony has blessed the Xperia Z2 tablet with the ability to be submerged in fresh water up to a depth of 1.5 metres for 30 minutes. You'll have to close up the flaps that hide the ports, but once sealed the Z2 is quite happy to get as wet as you are in the bathtub.

It's an amazingly responsive tablet, incredibly quick and able to play any game in the Play store without any trouble. It also comes with a preinstalled remote control app for Sony TVs, Walkman music player app and the ability to act as a second screen for PS4 users. Sadly, we don't have a PS4 to test this with or a Sony TV to use the remote function on, so you'll need to read up on the compatibility of your model and just how well it works with a PS4. The Walkman app is quite good, though; for £9.99 per month you can access the Sony Music Unlimited store and play the immense catalogue there.

The battery life on the Xperia Z2 tablet is also pretty impressive. With the mixed tests we ran through, from a full charge, we managed to clock a good nine hours of use before needing to plug it in for a recharge. Incidentally, the recharge only took just under an hour, thanks to the Quick Charge 2.0 fast battery charging technology.

Prices for the Sony Xperia Z2 tablet vary, but the majority seem to lean toward the £329 mark, which means it costs slightly less than the Samsung Galaxy Note 10.1. It's nearly twice as expensive as the Archos 101 Oxygen, but this is by far the best performing tablet of the group. And you get to use it in the bath, which is always a bonus feature in our view.

### Sony Xperia Z2 tablet

Although it still costs £329, the Sony Xperia Z2 tablet is a stunning mobile device. The battery is great, the performance is superb and as you've no doubt already noticed, we like using it in bath.

### Archos 101 Oxygen

The Archos 101 Oxygen is another excellent Android tablet, which is fast and lightweight enough for a variety of uses. It's battery isn't great, though.

## How We Tested

Each tablet was fully charged then used in a variety of everyday tasks: work, with an office suite installed; gaming, with a small selection of games; video, playing different HD content from a NAS drive; and browsing.

We also used the cameras, browsed through photos, and took a bath with the Sony Xperia.

| | Linx 10 | Hannspree Hannspad 10.1 | Lenovo ThinkPad 10 | Samsung Galaxy Note 10.1 | Archos 101 Oxygen | Sony Xperia Z2 tablet |
|---|---|---|---|---|---|---|
| **Price** | £150 | £100 | £700 | £350 | £169 | £329 |
| **Installed OS** | Windows 8.1 | Android 4.4 | Windows 8.1 Pro 64-bit | Android 4.0 | Android 4.4 | Android 5.0 |
| **CPU** | Intel Atom Z3735F 1.3GHz | ARM Cortex-A9 1.3GHz | Intel Atom Z3795 1.59GHz | ARM Cortex-A9 1.4GHz | Rockchip RK3288 ARM-A17 | Snapdragon 801 2.3GHz |
| **GPU** | Intel HD | PowerVR SGX540 | Intel HD | Mali 400-MP4 | Mali T764 | Adreno 330 |
| **RAM** | 2GB | 1GB | 4GB | 2GB | 2GB | 3GB |
| **Storage** | 32GB | 16GB | 128GB | 16GB | 16GB | 16/32GB |
| **Dimensions** | 172 x 258 x 10.5mm | 179.9 x 263 x 9.8mm | 177 x 256 x 8.95mm | 180 x 262 x 8.9mm | 172 x 240 x 10mm | 172 x 266 x 6.4mm |
| **Weight** | 600g | 620g | 590g | 620g | 570g | 439g |

# Your Letters

## 10 Questions

I have my own way of backing up my computers. It goes as follows (and all the software I use is totally legal and purchased by yours truly): I have two identical Crucial SSD 512GB hard drives, and regularly 'clone' the whole drive, from one to the other using EaseUS Todo Backup Workstation, which I regularly update to the newer version.

When cloned, I then use the resulting 'cloned ' drive for a while – and when I choose I clone that to the other drive et al. My computer continues on it's way with Windows activation unaffected.

Now the Windows 10 upgrade questions. Let us assume the download has gone without any problems and I decide I will upgrade:

**1:** If I disconnect from the internet will that interfere with the NEW activation and will my original Windows 7 activation code be wiped out on the Microsoft servers when I do connect to the internet?

**2:** If, after using Windows 10, I decide I don't like it and want to revert to Windows 7, will my original Windows 7 code still be valid and activated automatically or will I have to go through the activation hoops manually?

Interesting questions, I think you will agree. Of course, if one decides to eventually install a full version, none of this is of interest – BUT, cynic that I am, is this a way of Microsoft wiping out 7 and 8.1 in one fell swoop once and for all?

As an aside, I am an 'insider user', and beta tested Windows 7, 8, 8.1 and Windows 10 – but Windows 7 rules for me. As I program and heavily video edit etc., my computer(s) are not used just for the internet (as seems likely with this latest version Windows, Office, Photoshop etc.). The clouds are for the birds!

***Richard Best***

## Menu Icon

Why oh why does Microsoft treat its customers so badly? No sooner have users got used to the hamburger icon for connecting to the menu, than MS starts using "..." as the icon in Edge.

Perhaps they feel that it will keep the users interested by inserting small changes to keep us on our feet.

It isn't only MS that does this. If you use Windows and Linux you will notice that Thunderbird, for instance, uses different menus depending on which version one is using.

Maybe it's to stop us being complacent.

Please developers be consistent.

***Steve Ward***

## BT Won't Share

Much to my surprise, I find myself sympathising with BT when they refuse to share ducts. Having acted as nursemaid for army cables in Gibraltar, Cyprus and Hong Kong NT I do know that it can prove a nightmare if the other people don't keep impeccable records.

For example, in the New Territories in the early 70s a typhoon gave rise to serious flooding along the railway line to China. We had a fairly deep joint pit on a duct route running alongside the rails that we shared with Hongkong Tele. Our cables were elderly paper-insulated lead sheathed types with joints secured in a plumbed in lead cylinder.

Rising water made obvious the fact that one joint had been opened (jointers with poor records tend to do that to check cable identity) and badly replumbed.

As a result of this, I spent over 24 hours up to my waist in water, trying to forget that sea snakes are much more venemous than mere cobras. The only light relief was the sight of the lad from the fish farm nearby who, with a lamp on his head and a big net was trying to keep up with his runaways...

***Ken West Walmer***

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**STEP 3** Tap 'Subscribe'

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**STEP 3** Choose whether to create an optional Zinio account

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# Edit Videos Everywhere

**Video editors are on your PC, on the web and on your phone and tablet. Which is the best and what are the pros and cons? Roland Waddilove investigates**

It was not so long ago that when you wanted to edit a video clip or produce a movie, you had to use a video editor running on your PC. These days you have a lot more choice, and it's possible to shoot, edit and share videos on a mobile phone or tablet, which is super convenient and no PC is required. Everything is done on a gadget that fits your pocket, but do these apps have sufficient features?

If you want to edit videos at work during your lunch hour and you're not allowed to install software, if you have a Chromebook laptop without the ability to install software or if just like working on the web, you can use an online video editor that runs in a browser. How easy is it, though, and what are the drawbacks?

Let's take a look at the different ways you can edit videos and produce movies with five programs for PC, five for mobile devices and five online tools. You don't have to choose one and stick with it of course, and you might want to use a PC for certain tasks and your phone or the web for others.

## PC Video Editors

Although videos can be edited on your phone or tablet or in a web browser, the large size of the files you have to work with prevent all but the smallest of projects. When you edit video on a PC there are no problems working with videos that are hundreds of megabytes. Video clips that are being edited can be any size and movies can be output

*For a free program, Movie Plus Starter Edition is good, and there is an upgrade path*

that are more than a gigabyte. Some people go so far as to have a second disk drive that is dedicated to storing video because of the space requirements.

Video editing software on PC offers more features than are available with cloud-based and mobile editors, and they're often packed with special effects that enable you to invert the colours, convert to monochrome, apply fake thermal imaging, pixelate, ripple and turn them into sketches, among other things. They also contain tools to correct problems with the video such as brightness, contrast, sharpness, saturation and tints.

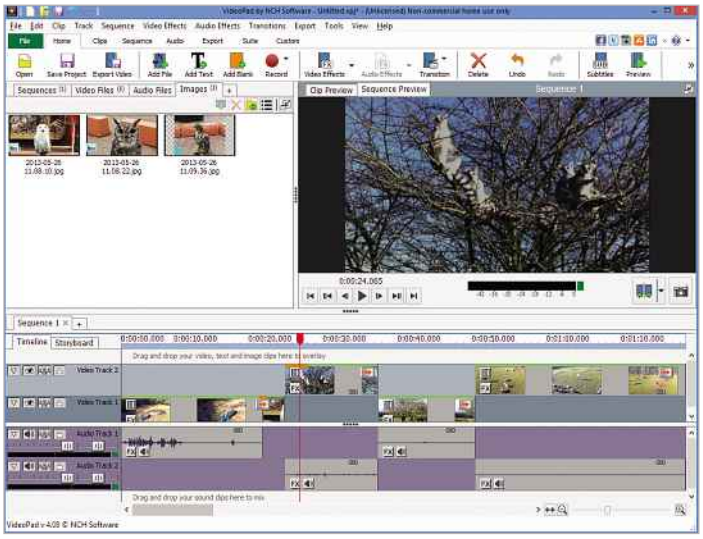
There are some excellent video editing programs such as Adobe Premiere Pro, but it costs over £200 a year, which puts it beyond many people's budget. Premiere Elements is more affordable at £64.81, and CyberLink PowerDirector and Corel VideoStudio are in the same price range.

> **"The range of video editing apps for phones and tablets and the choice you have is amazing"**

Rather than revisit well-known applications, here are five cheap or free lesser known video editors for your PC that are worthy of space on your hard drive. Some of them are very good considering their low or zero price, and you should try them before digging deep into your wallet for pro software. If you are running Linux, you might also want to look at Openshot (**openshot.org**) and LiVES (**lives-video.com**), two open-source video editors that you can install in Linux or run from a live CD/DVD.

### MoviePlus Starter Edition

Serif gives away older versions of many of its programs, and if MoviePlus X6 is beyond your budget at £61, MoviePlus Starter Edition (**serif.com/free-video-editing-software**) is one of the best free video editors for Windows. It's surprisingly full featured and easy enough for novices to use. Movies and photos can be imported into a project, and thumbnails appear in the Media panel on the right. Clips and images can then be dragged to the bottom of the window to set the playing order.



*VideoPad is a good budget video editor with a lot of great features*

The video is assembled using storyboard or timeline views. The latter shows overlay, video, audio and music tracks. Items can be dragged and dropped to move them around, double clicked to trim them, transitions can be applied, the audio volume can be adjusted, movement effects applied to static photos and much more. There are many predefined formats for the finished movie output, including normal and widescreen, 720/1080 HD resolutions and YouTube formats.

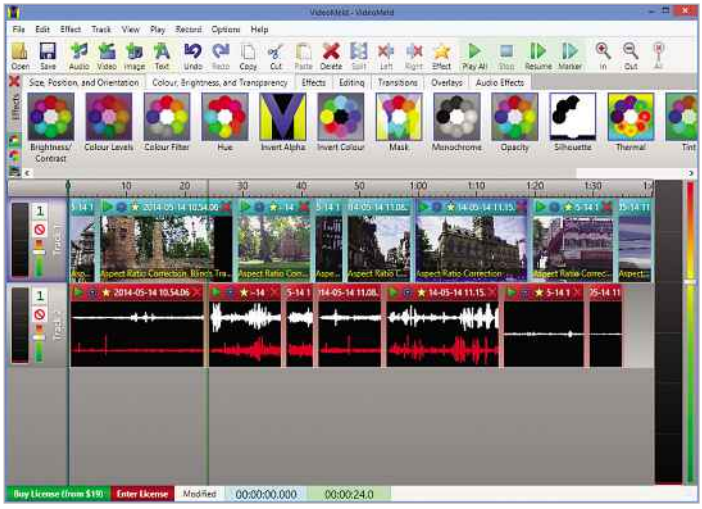
### VideoPad

VideoPad (**nchsoftware.com**) is available in three versions, and you can choose from free, Home Edition (£33.55) and Masters Edition (£53.68), depending on the number and range of features you need. The freebie is very good and has a lot of features, so try it and only upgrade if you need something more powerful.

The top-left panel shows video clips, photos and audio files, the top-right panel previews media files, and the bottom half of the window is where the movie is assembled. There are storyboard and timeline views, and the latter has two video and two audio tracks. Videos, photos and audio can be dropped in the timeline and

*Kate's Video Toolkit has the tools, but it lacks a timeline and project overview*

*Lightworks, as used by some of the top professional Hollywood movie editors*



*There are a lot of interesting effects in VideoMeld, and it offers cheap upgrades*

dragged around, and effects can be applied. The range of effects is good, with crop, mirror, motion blur, sepia, cartoon, fisheye and many more. There's even green-screen, which is unexpected in a budget editor. Text can be added, you can record narration and much more.

### Kate's Video Toolkit

Kate's Video Toolkit (**fakewebcam.com**) is now up to version 7 and it's a bit primitive compared to some video editors, but if you find some of the other tools too complicated, then it's worth a look. The editor has an unusual interface that is unlike regular video editing software, and it's more like a collection of tools.

Select the Play tab and you can open a video clip. The Cut tab can then be used to trim the start and end points and rewrite the clip. The transition tab lets you select two clips and a transition effect, then outputs them as a single file. The Join tab lets you join several clips together and save the resulting movie. The Mix tab lets you mix movies and music, and the Convert tab converts one video format and size to another. The interface makes the process of creating a movie from several clips harder than it should be.

### Lightworks

If you aspire to become a professional video editor, Lightworks (**lwks.com**) is one of the applications you should definitely get to know, because it has been used by some of the top people in Hollywood. It was used to edit The *Wolf of Wall Street* with Leonardo DiCaprio, for example. Yet this pro tool is free of charge. You would not expect Hollywood, with its mega movie budgets, to use free software, but it's true.

Lightworks is powerful enough to edit a two-hour commercial movie destined for the theatres, but the price of all this power is in usability. Initially it's confusing, and it even looks underpowered and overcomplicated, but if you spend an hour or two watching the video tutorials on the website before your start, it will ease the learning process. There are some very clever and very powerful features in this video editor, but it has a steep learning curve that might put you off.

### VideoMeld

VideoMeld (**videomeld.com**) is by GoldWave, a company the is better known for its audio editing software. This video editing software is sort of free, in that you can create videos of up to five minutes in length. Five minutes may not seem long, but nearly all videos shared on Facebook are under this, and a large proportion of YouTube videos are too. A one year licence is cheap at $19 (£12).

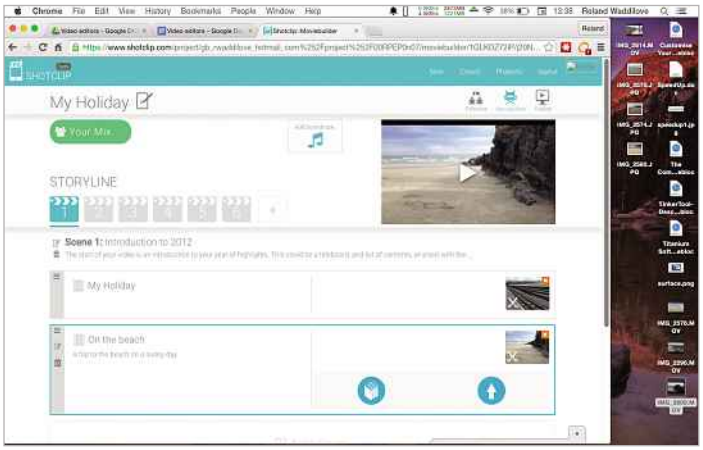
Video and audio tracks are displayed in a timeline in the lower part of the window, and it copes with multiple tracks. Several video clips at a time can be selected, and then they can be dragged and dropped in the order they're to play. The start and end points can be set, and a variety of video and audio effects, filters and overlays are available. The brightness, contrast, saturation and other attributes can be adjusted. All these items are on a toolbar above the timeline and can be dragged and dropped onto clips.

## Online Video Editors

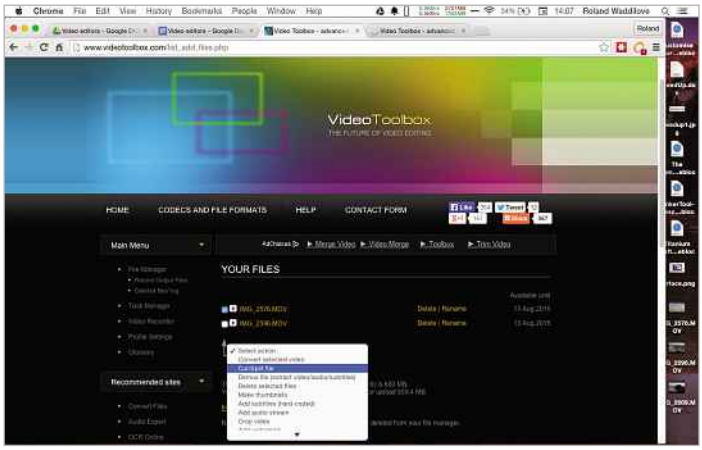
There are several problems with editing videos online in a web browser, and the obvious one is the size of the files involved and the time it takes to upload them. If the clips are on your PC, then a PC-based video editor has a clear advantage, because it can load files directly. If a video is on a phone or tablet, then the same applies, and you can load it in seconds.

A video that is to be edited online must be uploaded, and the time it takes to do this depends on your internet speed and the server speed. On a good internet connection, you may be able to upload at 1MB/s, so it's possible to upload HD video reasonably quickly. In 10 minutes, you could upload enough to edit down to a three- or four-minute movie, which is a common length for video sharing sites like YouTube.

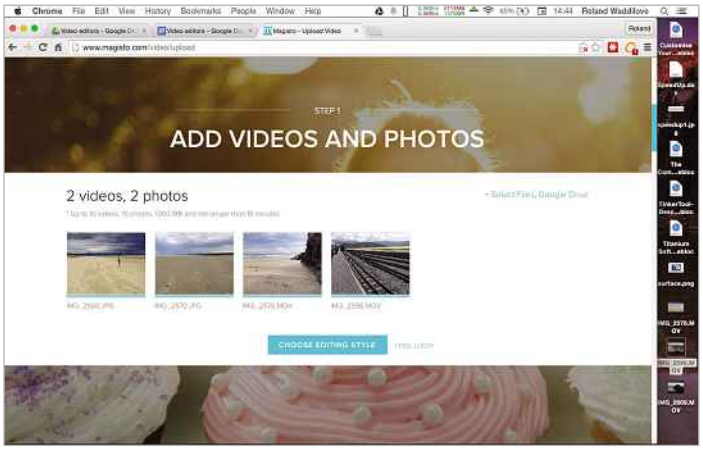
The upload speed is just one factor, and with each video upload, the server will typically process them and convert them to its own internal format. This introduces another delay before you can begin to make an edits to the clips. If there are a lot of people on the website uploading and editing videos, the server might slow down.




*Shotclip is a simple online editor you can use with friends*




*Video Toolbox is a primitive editor but has good format conversion tools*




*Magisto is brilliant and makes fantastic videos, but you have little control*

Video editing requires a lot of processing power, a lot of bandwidth, a lot of disk space and a lot of memory. Some websites have tried it but closed, and several that used to offer online video editing have disappeared from the web. Replacements are a bit thin on the ground, but there are some.

### Shotclip

Shotclip is an interesting online video editor that builds videos from storylines, and each of these is made up of one or more scenes. And after uploading a video clip for the first scene of the first storyline, you can add more scenes or go to the next storyline and upload a clip for each of them too. Titles and notes can be entered for each storyline and scene to make organising them easier.

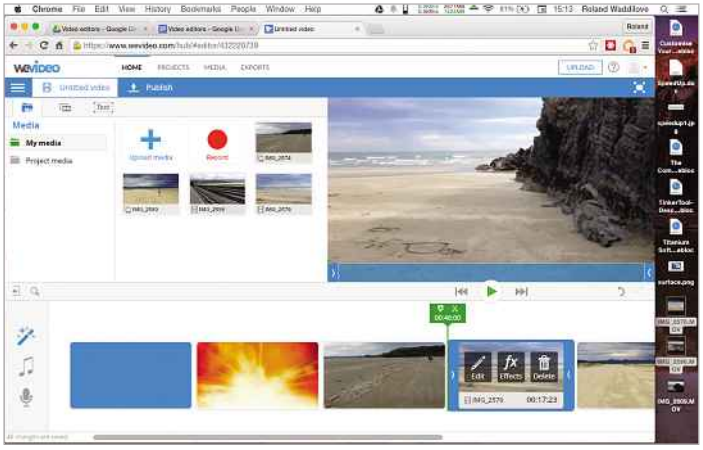
> **There are several problems with editing videos online in a web browser**

Scenes can be dragged and dropped to rearrange the playing order and the start and end points trimmed. There are no special effects, and the only extra is the ability to add a sound track. Where this online editor stands out is the collaboration features. You can invite friends to contribute to the movie and add their own storylines and scenes. The finished movie can be output as 480p, 720p or 1080p, with the lowest resolution being free. Shotclip is very limited, but templates to get you started and collaboration with friends makes it fun.

### Video Toolbox

Video Toolbox (**videotoolbox.com**) is exactly what the name implies: a collection of tools that can be used to process videos. The interface is very unusual and not in a quirky good way as some are. The home screen is a file manager, and you can upload video clips and store them online. Files are kept for one month, and the storage space is 600MB, which is fair enough considering this is a free service.

After uploading several clips, you can select one or more and then choose an action from a menu, such as cut/split, merge, crop, add audio, add subtitles and a few more. The functions are primitive, and when splitting a video, for example, you enter the time without being able to see a preview. Video Toolbox's best feature is the file format conversion, and it supports a long list of formats and devices. You can upload a clip in one format and download it in another.




*WeVideo is a very good attempt at making a web-based video editor*

### Magisto

Magisto (**magisto.com**) is like a web version of the sort of fun app you might get on a mobile phone. It's very basic, very easy to use and has few facilities, but it's good fun. The browser interface is attractive, and the site takes a simple step-by-step approach. You first select up to ten video clips on your computer and up to ten photos. There's 1TB of online storage, and videos of up to 15 minutes in length can be created.

You then choose an edit style. These are predefined templates, and you have no control over the editing. You just select the one you want, such as Let's Party, Just Chillin', Traveller, Adventure Sports and many more. Next you select the music, and you can upload your own or select from the library of featured tracks. The finished video can be downloaded or shared on various social media sites. Magisto is like handing your videos and photos to an expert and getting back your finished movie complete with special effects, fantastic edits, titles and more.

### WeVideo

WeVideo (**wevideocom**) is a great demonstration of what is possible with online video editing, and the editor in the browser is modelled on desktop software. It's greatly simplified, as it has to be running in a browser, but it has the fundamentals you would expect of a video editor. For example, there's a media browser, and you can upload multiple video clips and photos. You can also record directly into the editor too.

The lower half of the editor is where you assemble the video clips and photos. It's a story view rather than a timeline, so clips are shown as a single frame thumbnail, and they're dragged and dropped into

*JW Player Editor has some good features, but is limited unless you pay*

order. The start and end of clips can be trimmed, and there's a limited but useful selection of special effects like monochrome, sepia and even image stabilisation. The audio volume can be adjusted, music and narration added, video and audio fade in and out and more.

### JW Player Editor

JWPlayer Editor (**bit.ly/1fERjYr**) is another online editor that mimicks offline ones, and it does a very good job too. It's like a lightweight and simpler desktop editor with not quite so many features. The free version lets you create only 30-second videos, and it costs $49 a year to make 15 minute ones. However, you do get some reasonably good features.

Video clips and photos are uploaded to your online library, and then you can drag thumbnails to the story timeline at the bottom. This shows the play order. Text such as titles can be added in an editor, and there's a small number of graphic filters like tints, sepia, negative and so on. There are lots of unusual graphical, cartoon-like transitions that are fun, and 17 animation effects, which are useful for photos. Movies can be downloaded at 400 x 300 for free or 640 x 480 for $3. If it did not cost so much, this would be a good online editor.

## Mobile Video Editors

The range of video editing apps for phones and tablets and the choice you have is amazing, but should you edit videos on your mobile device or transfer them to the computer where you can use heavyweight and feature-packed applications?

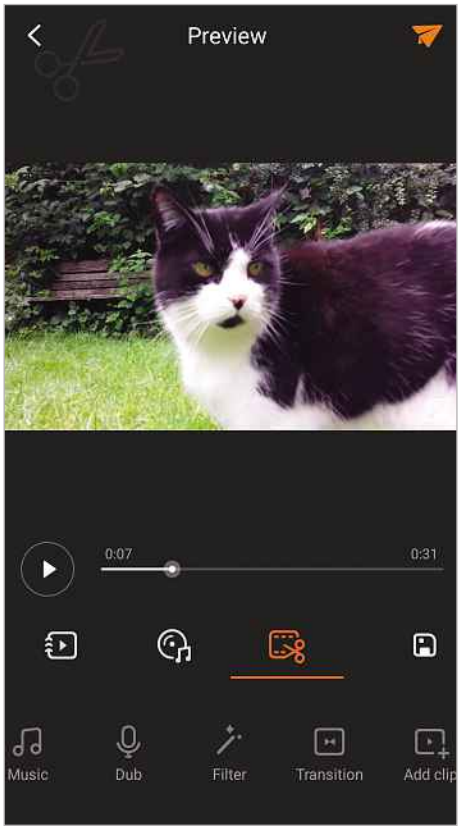
A lot depends on what you intend to do with the video, and many video clips are both shot on a mobile phone and viewed on it. For example, you might shoot a short clip of something funny or interesting and then share it on social networks like Facebook. Your friends can then view it on their mobile phones. This is frequently done without any video editing or minimal editing at least.

There are different types of video editor on phones and tablets, one of which is the serious type, such as iMovie on the iPad and iPhone. This is more like a desktop video editing program, and you can assemble a movie from multiple clips, apply special effects and transitions, add music, remix, re-edit and save it. The other type of video editor is just for fun. You select a video, choose some music, pick a theme or template and output a fun movie. You have little control over the creation process, but the finished videos are impressive and they're perfect for sharing.

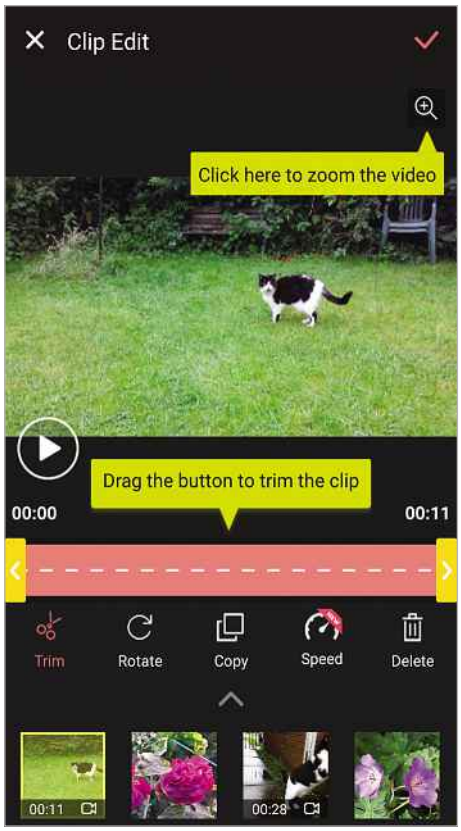
Here are five video editors you should try on your phone or tablet, which is really just a tiny sample of what's available.

### VivaVideo

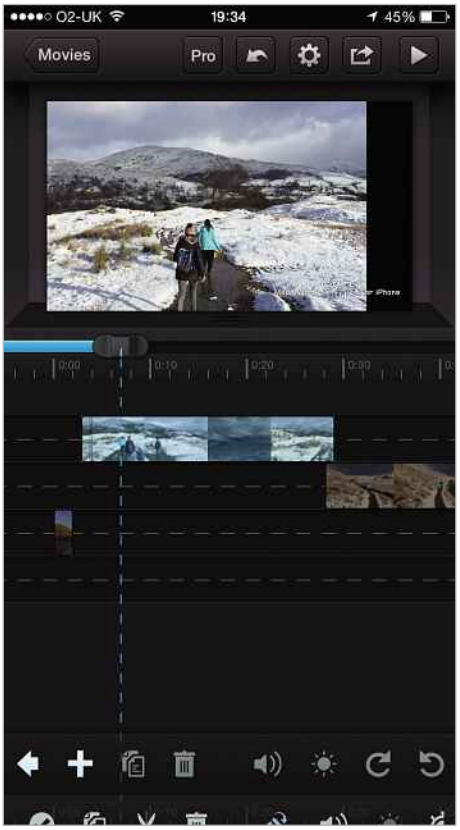
This app is available on both iOS and Android, and it has some great features. It definitely belongs in the fun category rather than trying to




*VivaVideo is packed with features and makes a great video editor*




*VideoShow is a surprisingly powerful video editor for a phone*




*No themes or stickers in Cute CUT, just good video editing tools*

*Great features, lots of transitions and effects make PowerDirector a useful editor*

*Vstudio enables you to assemble a video using video, photo, filters and transitions*

be a serious editor, but you can create movies without effects if you want to. You capture or load previously taken video clips and the start and end points can be trimmed. Each one is then added to a tray at the bottom of the screen and when you have added all the clips you need, you move on to the next step.

The video can be saved as it is and exported to the phone's storage or shared on various social media services, but there are a lot of fun effects that can be applied to the video. There are themes that apply a whole series of effects throughout the video, adding graphics overlays, music, sound effects, visual effects and more. There are cartoon stickers, filters like hot, autumn, old film, sketch and more and transitions.

### VideoShow: Video Editor & Maker

This is another great video editing app for Android. There's an iOS version, but it's simpler and does not have all the excellent functions and effects of the Android version. You start by selecting the videos and photos you want to add to the movie, and they can be rearranged by tapping and dragging. A collection of themes is provided like Nature, Cinema, Birthday, Baby and so on. These add graphical overlays, zoom to photos and background music. There are filters like sketch, sepia, emboss, HDR, old booth and music too. One tap and a theme, filter or effect is applied.

The Pro upgrade adds clip editing, subtitles, stickers, transitions, drawing, narration, 4k video support and more. The extra features are really worth it, considering it costs just £2.32. If you don't want to put much effort into video editing, the free version is fine, but if you want more features, then upgrade to Pro.

### Cute CUT – Full Featured Video Editor

Cute CUT on iOS appears to be different to CuteCut on Android, but they both have high ratings and are worth a look. The iPhone version is interesting, and most of the screen is occupied by the timeline. There's the time across the top and videos, and photos are added to separate tracks. You build up the movie by adding extra ones for clips and photos.

The start and end points for clips can be edited, and there's a small selection of transitions to place between clips and photos. The position and duration is adjustable. The transparency of a clip or photo can be set, which enables some interesting effects to be created. The speed of a clip can be adjusted, it can be rotated, the volume lowered and it can be split. Some of the controls seemed a bit unresponsive or unintuitive, or maybe it's just fat fingers on a small screen that's the problem. It does have some good features, though.

### PowerDirector

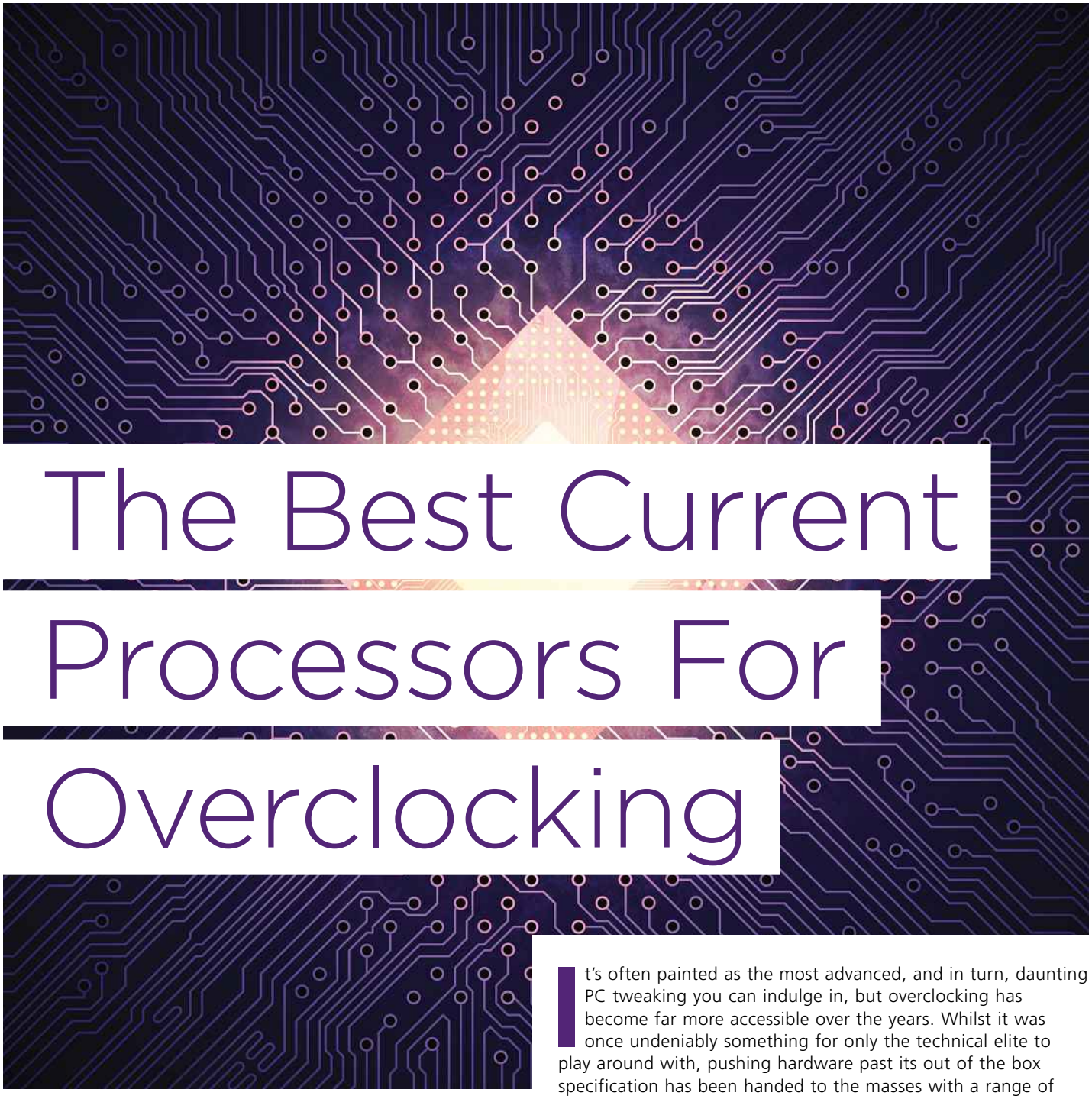
CyberLink video editing software for PC is well known and is excellent. The Android app, PowerDirector, is very good too, but iOS users will be disappointed by the lack of an app. The timeline is displayed across the bottom of the screen, and you can browse the videos, photos and music in the top part of the screen. Tapping an item adds it to one of the tracks in the timeline. Markers are placed between videos and photos, and tapping one enables you to choose from a wide range of transition effects, over 20 of which are provided.

There are 20 special effects too, such as Bloom, Delay, Drain and others – meaningless names, but fun effects. Text titles can be added, but these are themed rather than being plain text, and they're intended for use at the start of the movie, Hollywood style. The audio level of the background music track and the video's audio can be adjusted, which is useful.

### Vstudio

Vstudio is a video editing app for the iPhone and iPad, and there isn't an Android version. It doesn't have themes, stickers and similar items, but it does have a good range of editing features. There are numbered boxes at the bottom of the screen, and you select each one and add a video clip or a photo. They are placed in alternate boxes, and the ones between are for transitions, of which there are eight.

Video clips can be trimmed at the start and end, and the brightness, contrast and saturation adjusted with a simple slider control. Voice-overs can be recorded for clips, and you can add your own music from the phone. Some extra features can only be unlocked by giving a five star rating (surely wrong), and there's a Pro version with more features. When you've finished, the video can be saved to the phone or shared on Instagram, Vine, Facebook and other places. It is simple but has all the features you need. **mm**



# The Best Current Processors For Overclocking

**Want to squeeze more power out of your PC, you'll need a decent overclockable CPU. Aaron looks at some of the best**

It's often painted as the most advanced, and in turn, daunting PC tweaking you can indulge in, but overclocking has become far more accessible over the years. Whilst it was once undeniably something for only the technical elite to play around with, pushing hardware past its out of the box specification has been handed to the masses with a range of increasingly overclock-friendly products being released.

Options that used to require physical modification (such as well-known the lead-pencil trick for AMD chips) are now a thing of the past, and built-in software has replaced hardware manufacturers' previous reluctance to let people tinker. Now, most hardware that can be overclocked comes ready and willing, with dedicated functions for people to play around with should they wish to. Even a new computer user now has access to relatively easy to use tools, so there's little excuse not to get some extra performance out of your hardware.

Still, even with the abundance of options now available, not all hardware is created equal. There are better models than others when it comes to overclocking – and this includes the CPU. Some CPUs are more suited to overclocking than others, whilst there are other options that simply don't handle

people pushing them past their established norms. Therefore, it's important to know what kind of CPU to go for if you're considering some overclocking and want to push your system a little harder.

We're going to take a look at this fact, as we delve into CPU market to pick out some of the best current overclockable CPUs you can get your hands on. These are chips that'll let you get the most out of your purchase; some are so good in this regard, they've even broken world records. There are also a couple of highly specialised, very expensive models that will only suit hardcore benchmarkers.

First, though, let's cover some overclocking basics, just in case you're new to the subject, and need a little introduction.

## No Limits

By now, most readers should be fully aware of overclocking but, just in case you're new to the term, it simply means tuning a piece of hardware to speed it up past its out-of-the-box factory specification. Just like tuning a car's engine to perform that little bit better, you can tweak various settings of some PC hardware, including CPUs, to run faster and perform better than they normally would. This includes ramping up clock speeds and voltages, amongst other things, in order to get a higher level of performance. The benefits can be great, but there are also downsides that add a whole extra range of concerns to the mix.

> **“The benefits can be great, but there are also downsides that add a whole extra range of concerns to the mix”**

The most pressing concern for any overclocker is power and heat. Overclocked hardware will usually use more power, and in turn it'll generate more heat. This can obviously lead to damage, and to counter it, a good understanding of cooling is required. Often an overclocked PC will require a new, better cooling system, including advanced options like water cooling. However, this is often only needed for extreme overclocking, and small tweaks will usually be safe enough (but not always, overclocking is always an at your own risk experiment).

Most casual overclocking is handled with BIOS/UEFI tweaks built into motherboard firmware, and software tools, many of which are also part of motherboard toolsets. These programs can manipulate such things as the clock multiplier and CPU Vcore, two of the most basic tweaks of any CPU overclock. In fact, it's a good idea to understand the basic terms beforehand if you plan to get involved. Here are a couple.

**Base Clock:** Abbreviated as BCKL, as you may guess, this is the base speed of the device that governs the basic clock speed. It's this that gets multiplied in order to produce the figure for overall clock speed.

**CPU multiplier:** This is used to multiply the basic clock speed of a device to produce the final clock frequency, and it often the main target for simple overclocking. For example, a CPU with a base clock of 100MHz with a multiplier of 30 would translate to a CPU with a 3.0GHz frequency.

**CPU Vcore:** This is the voltage supplied to the CPU. This often needs to be adjusted to provide more power to the chip when overclocking, as faster speeds require more power.

There's a lot more to overclocking, including the processes and many more terms to learn about, but we're looking at some of the best CPUs for overclocking, not the actual practice here, and these fundamental terms are enough to get you started.

## Why?

You may be wondering why you'd even want to overclock, especially if you've not tried it yourself before. The simple, most basic reason to do so is to push your CPU harder than normal. All CPUs are released with factory default settings, and run as the manufacturer intended, but this level of performance isn't set in stone, and most CPUs are capable of running faster than their out of the box speed.

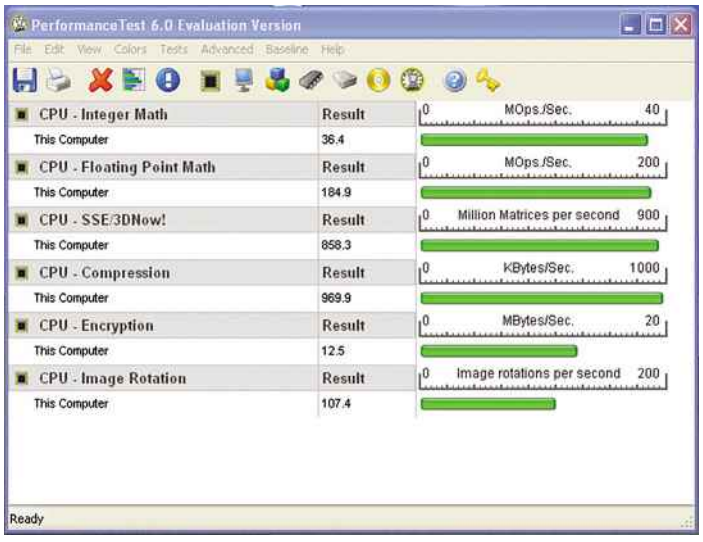
As we mentioned before, this used to be something hardware manufacturers looked upon with disdain, and was a warranty-breaking practice. Over the years, however, manufacturers have grown to adopt overclocking as a viable selling point, and few CPUs now ship without some form of overclocking ability. There are even competitions and world records for the best overclocking results, and a sub-section of the computer industry has grown up around the activity, with specialised hardware and supplies made available to those who want to indulge in their own crusade to get more power from their hardware.

Getting more power out of a CPU is not only beneficial to your PC use, but also your wallet. You can actually save money by buying a slower CPU and overclocking it to run almost, if not just as fast as a more expensive model. It's also one way to extend the life of an older system, putting off that expensive upgrade for a little longer. For some, overclocking is a simple hobby, and just succeeding in bettering your last benchmark score is the goal.

Whatever the reason, one thing is all-important, and that's the CPU you'll use. To get the best results you'll need not only the skill and know-how, but the right hardware. So, let's have a look at some of the best CPUs out there for the budding overclocker.

## Down The Chippy

There's no real, uniform way to judge what the best overclockable CPU is, as results vary as wildly as the CPUs out there. Some would argue benchmark scores are the bottom line, whilst others routinely use FPS measurements or the clock frequency. We'll look at CPUs that have earned their stripes in



various ways here, but be aware that overclocking results do vary, so your experience may not be exactly the same. For a simple guideline we're going to use Passmark's PC Mark scores to give you a good idea of how these CPUs stack up.

**AMD FX-6120 Six-core**

Our cheapest entry is the AMD FX-6120. Although probably hard to get hold of now, as it's an older CPU, it's still a good basic model that you can find online for a modest price, and, it's especially useful for beginners to play around on and learn the craft, as it doesn't hold your hand as much as many new chips, so you need to really learn the basics.

Far from the most powerful chip around, it still commands a decent benchmark score of 6,728 in PassMark's CPU Mark test,

> **“This is a good choice, as you can push it enough to really get some good value”**

making it a good CPU choice for day-to-day use, and a possible way to beef up an older model system.

**Intel Core i5-3350P 3.1GHz**

Found online for around £130, this lower-end Core i5 Intel chip can still hit benchmark scores of 6,901, and as it's an i series CPU, it's as solid as they come. Its out of the box speed of 3.1GHz is augmented by a turbo speed of 3.3GHz, and it has plenty of overclocking potential.

As with the AMD FX06120, we'd recommend this, and many other lower-end chips as good practise models to use whilst you're getting to grips with the overall overclocking process. Or, if you're simply looking to save money, this is also a good choice, as you can push it enough to really get some good value.

**AMD FX-9370 Eight-core**

AMD's FX-9370 eight-core CPU steps up the overclocking score results considerably, coming it at around a 10,429 high, with an average PassMark score of 9,558. The clock speed out of the box for this model is 4.4GHz, and its turbo speed is 4.7GHz.

As it's around the same price as the Intel Core i5-3350P, there's no reason to settle for the slower chip when you can have this one, unless your motherboard is Intel, of course – or you simply prefer to use Intel tech in your system. If this isn't the case, this is a cheap and promising AMD option that overclocking can improve greatly.

**Intel Core i7-4790K 4GHz**

Returning to the Intel stable, we come now to the Core i7-4790K, which is a much more powerful model – and one of Intel's hugely popular i7 line of CPUs. With an impressive 12,174 high benchmark score, averaging at around 11,239, it's a bit of a worker when pushed, and is a great overclocking CPU choice.

It has a basic speed of 4.0GHz, which ramps up to 4.4GHz turbo speed. It has a lot of potential for overclocking, and should only set you back around £230 if you shop around to find the right deal. This means you'll get a lot of overclockable power for the price, and a chip that's at home on most decent motherboards.

| Benchmark | Score | Cpu | Motherboard | Overclockers | Type |
|---|---|---|---|---|---|
| Memory Clock-DDR4 SDRAM | 4431MHz | Intel Core i7 5960X | ASRock X99M Killer/3.1 | Nick Shih | Hardware First Place |
| Memory Clock-DDR4 16GB SDRAM | 3872MHz | Intel Core i7 5960X | Asus RAMPAGE V EXTREME | Hiwa | |
| 3DMark Vantage - Performance | 117700 | Intel Core i7 5960X | Asus RAMPAGE V EXTREME | Elmor | World Record |
| 8x GPUPI for CPU | 2min 14sec 133ms | Intel Core i7 5960X | GIGABYTE X99-SOC Champion | Sofos | Global First Place |
| 8x Cinebench - R15 | 2481 cb | Intel Core i7 5960X | GIGABYTE X99-SOC Champion | Sofos | Global First Place |
| 8x wPrime - 32m | 1sec 921ms | Intel Core i7 5960X | GIGABYTE X99-SOC Champion | Sofos | Global First Place |
| 8x XTU | 3087 marks | Intel Core i7 5960X | GIGABYTE X99-SOC Champion | Dines23 | Global First Place |
| 16x GPUPI for CPU - 1B | 1min 59sec 938ms | Intel Xeon E5 2699 V3 | GIGABYTE X99-SOC Champion | Sofos | Global First Place |
| 16x Geekbench3 - Multi Core | 48289 points | Intel Xeon E5 2699 V3 | GIGABYTE X99-SOC Champion | Sofos | Global First Place |
| 8x Geekbench3 - Multi Core | 44156 points | Intel Core i7 5960X | GIGABYTE X99-SOC Champion | Steponz | Global First Place |
| 8x HWBOT Prime | 9761.78 pps | Intel Core i7 5960X | MSI X99A GODLIKE GAMING | BenchBros | Global First Place |
| Cinebench R11.5 | 25.82 points | Intel Core i7 5960X | MSI X99A GODLIKE GAMING | BenchBros | Global First Place |
| GPU Pi Fun CPU 1B | 2min 16sec 938ms | Intel Core i7 5960X | MSI X99A GODLIKE GAMING | Wizerty | Global First Place |
| Catzilla 1440P | 32408 marks | Intel Core i7 5960X | MSI X99A GODLIKE GAMING | Wizerty | Global First Place |
| Memory Clock-DDR4 SDRAM | 4403MHz | Intel Core i7 5960X | MSI X99 XPOWER AC | Vivi | Hardware First Place |
| 8x Cinebench - R15 | 2281 cb | Intel Core i7 5960X | MSI X99A GODLIKE GAMING | Zoolio | Global First Place |
| Catzilla 720P | 81547 marks | Intel Core i7 5960X | MSI X99A GODLIKE GAMING | Zoolio | Global First Place |
| Fire Strike Extreme | 13553 | Intel Core i7 5960X | EVGA Z99 FTW | Kinggaln | World Record |

Note: The listed benchmark scores were new records at the time of completing the benchmark. Some benchmark records were surpassed by another overclocker at a later time.

**Intel Core i7-5960X @ 3.00GHz**
**Intel Core i7-5930K @ 3.50GHz**

We've got two Core i7 chips next that are great examples of Intel's high end i7 series, and the main reason why this is such a popular option. First we have the £400 i7-5930K; with a starting speed of 3.5GHz and a turbo speed of 3.7GHz, it's a serious contender, and one that's managed to hit a high of 15,745 in benchmark tests, along with an average score of 13,687.

The Intel Core i7-5960X, however, is even more powerful. In fact, it's one of the most powerful CPUs around, certainly in the home PC market. It's basic speed of 3.0GHz amps up to a turbo of 3.5GHz, but the overclocked benchmark scores really do speak for themselves. The average of this unit racks up an impressive 16,029, whilst the highest mark currently on PassMark's records is a whopping 19,025.

> **One of them most popular, and brilliant motherboards used for overclocking is the Asus Rampage V Extreme**

True, the 5960X costs around twice that of the 5930K, coming in at around £800, but if you're looking for a good Intel chip to overclock, there simply aren't many other options, unless you go to the Xeon range...

**Intel Xeon E5-2699 v3 2.30GHz**
**Intel Xeon E5-2698 v3 2.30GHz**
**Intel Xeon E5-2697 v3 2.60GHz**

Now, whilst these CPUs are obviously more at home in a corporate server room environment, hardcore overclockers are known to play around with these powerful chips nonetheless. When it comes to raw power, and high benchmark scores, they're pretty much unmatched, as is the amount they cost.

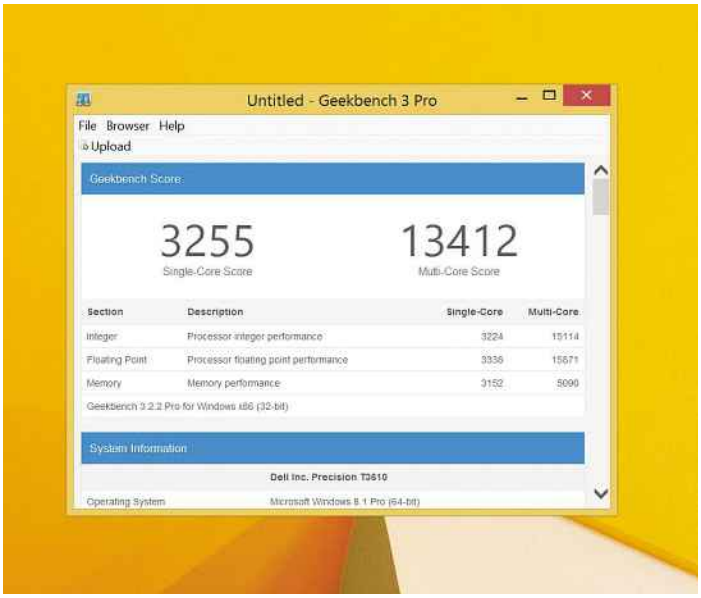
We've got three examples here, with the cheapest (relatively speaking) being around £2,110. This is the E5-2697 v3. This 2.6GHz (3.6Ghz turbo) 14-core server CPU averages benchmark scores of around 22,058, which dwarfs the best previous records already. The high score, however, hits 22,449, which is impressive, but is still bettered by the E5-2698 v3. This manages an average of 22,309, and has hit a high of 23,517. This chip itself is a 2.3GHz (3.6GHz turbo), 16-core model.

The winner, however, is undoubtedly the Xeon E5-2699 v3. This 18-core, £3,350 monster weighs in with similar clock speeds, but manages to average benchmark score of 23,808, and holds a record overclocking score of 24,461. That's some serious computational power. This isn't simply achieved by normal means, though. Many extremely advanced methods were used here, including the use of liquid nitrogen for cooling, not something your average user really wants to be playing around with.

Of course, these scores (and averages) are based on a global user base, which doesn't always reflect the highest possible score. Sometimes you have to go that little further and more specialised, such as the team of overclockers used by hardware vendor G.Skill.

## Record Breaking

At the fourth annual OC World Record stage at Computex 2015 a team of professional overclockers worked to set various world records using some of the CPUs we've mentioned here. It actually pushed the Intel Core i7 5960X to an unbelievable score of 117,700 in 3DMark's Vantage (Performance) and an 18x Geekbench3 score of 44,156. That event also saw a Xeon E5 2699 clock a Geekbench3 score of 48,209.



Other hardware was also used, and mentioned in thanks by the team, including one of the most important aspects of overclocking, the motherboard. Although we're focusing on CPUs here, motherboards are also very important, and the right motherboard and firmware can determine your results greatly. As with CPUs, not all motherboards are created equal in this regard, and some are far better than others.

One of them most popular, and downright brilliant motherboards used for overclocking is the Asus Rampage V Extreme, as used by the G.Skill team for many of its records, along with Gigabyte's X99-SOC Champion. MSI's X99A Godlike Gaming and X99Xpower AC were also used, along with an EVGA X99 FTW.

A lot of motherboards make good overclocking foundations, with Asus models arguably being amongst the most popular, followed by Gigabyte and MSI. So, along with your new, to-be-overclocked CPU, you should ensure you have a decent motherboard to go with it.

Now, benchmarks aren't the only scores, as we've already mentioned, and clock speeds (or frequencies) are just as important to many. Some concentrate of pushing CPU clock speeds further and further, and there are many records held, which vary depending on the software used to measure the results. A popular source of information here is the utility, CPU-Z. Some example world records coming from this measurement include a record 8,794MHz using AMD's FX-8350, 7,181MHz with an Intel Core i7 4770K. For some, pushing even older chips that to achieve records is how they judge their skills, like a recent result of 8,329MHz using an Intel Core 2 Duo E6550. You can see these records, and more, at **bit.ly/1MjmYbP**.

More recent records have also been set, as can be seen using the website HWBot (**hwbot.org**). The current number one here is an 8,722.78MHz AMD FX-8370. This was achieved using liquid nitrogen as a cooler and an Asus Crosshair V Formula-Z motherboard. The AMD FX series holds quite a lot of records here, dominating the top 20. Surprisingly, at the time of writing, the top 20 only had two entries, and both of these were for Celeron CPUs (the 352 and 356), not the Core ix series.

> **The right motherboard and firmware can determine your results greatly**

Another impressive performer is the record held by Intel's Xeon E5 2699 v3 on the site. This currently sits at a Geekbench3 score of 70,480. Now, the observant amongst you will then wonder why the aforementioned G.Skill world record with the same CPU and benchmark was only 48,209. That's because G.Skill used a single E5 2699, whilst the record holder on HWBot (Dhenzjhen) used two CPUs to achieve the score.

Even with the various means and methods used, you can see that a lot of the CPUs used to set records are familiar models, and we included them in our round up here for just that reason. So if you're thinking of having a go at some serious overclocking, and want to find the perfect CPU for you, now you've got a good place to start. **mm**

**HWBOT World Records**

(last update: June 20, 2015)

| BENCHMARK | WR | OVERCLOCKER | CPU | MOTHERBOARD | MEMORY | VGA | PSU | DISK |
|---|---|---|---|---|---|---|---|---|
| **CPU BENCHMARKS** | | | | | | | | |
| Cinebench - R11.5 | 58.41 | PreacherMan | Intel | | | | | |
| Cinebench - R15 | 6713 | dhenzjhen | Intel | | | | | |
| CPU Frequency | 8722.78 | The Stilt | AMD | ASUS | AMD | ASUS | | |
| Geekbench3 - Multi Core | 70480 | dhenzjhen | Intel | Supermicro | | | | |
| GPUPI for CPU - 1B | 85.83 | dhenzjhen | Intel | | | | | |
| HWBOT Prime | 14505.64 | dhenzjhen | AMD | | | | | |
| PiFast | 9.66 | Dancop | Intel | ASRock | G.SKILL | | Seasonic | |
| SuperPi - 1M | 5.07 | Chi-Kui Lam | Intel | ASRock | Teamgroup | | Antec | OCZ Technology |
| wPrime - 1024m | 23.3 | PreacherMan | Intel | | | | | |
| wPrime - 32m | 1.54 | kingpin | Intel | Evga | G.SKILL | | | |
| XTU | 3097 | Dinos22 | Intel | GIGABYTE | G.SKILL | | | |
| **VGA BENCHMARKS** | | | | | | | | |
| 3DMark - Fire Strike | 43380 | 8 Pack | Intel | GIGABYTE | HyperX | Galaxy | Super Flower | |
| 3DMark - Fire Strike Extreme | 33229 | kingpin | Intel | Evga | | Evga | Evga | |
| 3DMark Vantage - Performance | 117700 | elmor | Intel | ASUS | G.SKILL | ASUS | | G.SKILL |
| 3DMark03 | 301064 | TeamAU | Intel | GIGABYTE | Corsair | ASUS | Corsair | Corsair |
| 3DMark05 | 75763 | TeamAU | Intel | GIGABYTE | Corsair | GIGABYTE | Corsair | Corsair |
| 3DMark06 | 59158 | Dancop | Intel | GIGABYTE | G.SKILL | Evga | Seasonic | |
| 3DMark11 - Performance | 53396 | 8 Pack | Intel | ASUS | HyperX | ASUS | Seasonic | HyperX |

# Top 5 Failed Games Consoles

**These systems just didn't have what it takes to succeed**

## 1 Nintendo Virtual Boy

In terms of games consoles, Nintendo has undoubtedly had some huge hits in its time, but the Virtual Boy was not one of them. You might think the Wii U has sold badly, but it's been a rip-roaring success compared to this foray into 3D gaming. Not only was the Virtual Boy cumbersome, needing to be supported by a stand rather than worn, the graphics were entirely red and black and generally looked rubbish. Also, it gave people headaches – which, it turns out, people don't really like when they're playing a Mario game.

## 2 Nokia Ngage

When you look at how much money *Candy Crush Saga* makes, it's clear that the mobile gaming sector is a lucrative one. To its credit, Nokia saw this coming. It realised that portable consoles like the Game Boy were hugely profitable, and with people already carrying mobile phones around with them, it figured the Ngage, a device that combined gaming and communication features, would surely be a hit. Sadly, that wasn't the case. Even though Nokia released what was essentially a very affordable smartphone, which was unusual at the time, the awkward gaming controls and strange placement of the ear piece on the side meant it wasn't much use as a phone or as a games system.

## 3 Sega Mega CD

When the original PlayStation was launched in the UK, it was the first time many people had played a games console that used CDs. But it wasn't the first, and among those that came before, there was the Mega CD, an add-on for the Mega Drive, which was released in 1991 in Japan, hitting our shores two years later. It did actually have some decent games for it, but it was too expensive for what it was, and those things, combined with a generally poor games library, meant it was destined for an early grave.

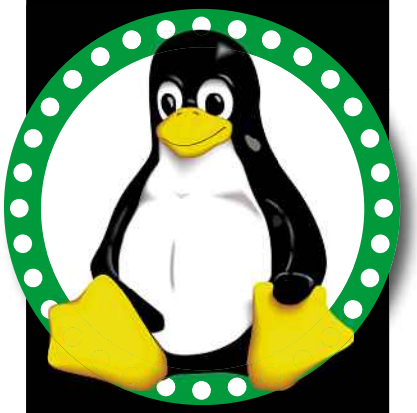
## 4 Atari Jaguar

Where did it all go wrong for Atari? When it bought out the Jaguar in 1993, its Lynx portable console had already failed, so it was pinning its hopes on this new 64-bit system being well received. Clearly one part it was concerned with was the controller design, but rather than worrying about how many buttons to include and where to place them, it just decided to have ALL THE BUTTONS IN THE WORLD, placed in a grid formation at the bottom of the pad. But that wasn't the only problem. It was also said to be difficult to code for, thanks to its multiple processors, and its games were mostly rubbish. A CD add-on arrived in 1995, but it was too late, and the system was discontinued a year later.

## 5 Ouya

There are loads of other consoles we could include here, like the Philips CD-i, the Neo Geo or the 3DO, but let's consider something more recent. The Ouya, as you probably know, is an Android-based console, which was funded by a hugely successful Kickstarter campaign. Its low price and open nature made it attractive to gamers, but ultimately, it was disappointing, with bugs aplenty and controllers that frequently lagged and disconnected. As of now, most retailers no longer stock the Ouya, and in April of this year, it was said to be looking to find a buyer for the company. Then in June, it was reported that peripheral maker Razer had acquired it, but at time of writing there had been no official announcement.

***You know these people aren't playing an Atari Jaguar, because they're actually having fun***



# Holiday Gaming

**Some great Linux games to kick off the summer hols**

David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

The kids have now broken up for their summer holidays. Six or seven weeks of lazy days, popping down to the beach, swimming, cycling, football in the park and relaxing evenings around a camp fire. Ah, to be young again.

However, the British weather likes to throw us a curveball from time to time, and when that happens, we can get some Linux gaming in. Here are four worthy contenders to check out.

**StarMade:** *Minecraft* isn't to everyone's tastes. Personally I don't get it, but my kids love it and regularly set up a LAN world where they both create something pretty spectacular. It's quite impressive, but for some, very limiting.

But *StarMade* may be able to claw back some of that lost interest. It's a *Minecraft*-inspired 3D sandbox space building/exploration/shooter with loads of worlds to visit, where you can you build your own fleet of spaceships, space stations and orbital weapons in order to either defend the galaxy or rule it.

*StarMade* looks good, and if you're really into *Minecraft*, then it could very well enhance your experience. Take a look at the demo at **goo.gl/YP0cU3**, then go to **goo.gl/iQSI36** and get hold of the latest Linux JAR file.

**Race The Sun:** *Race The Sun* is an extraordinarily fast-paced racer, where you speed through various regions in order to beat the sunset and get as high a score as possible.

It looks very nice indeed and goes to show what can be achieved on a Linux system. There's plenty to get your teeth into, with a world editor, multiplayer and online options, and the ability to race other players' created worlds, this game could be a clear winner.

The developer, Flippfly, has the game up on Steam for a mere £6.99, available at **goo.gl/oSq09d**.

**Dead Sky:** Zombies appear to be everywhere at the moment, a cultural outbreak of wannabe walking undead you could say. Nevertheless, the gaming world's favourite antagonist is sadly lacking on Linux, but *Dead Sky* may remedy that. It's an action packed shooter, in the same vein as *Dead Nation* or *Zombie Apocalypse* for the PS3. The idea is fairly simple: fight the undead, complete your mission objectives, upgrade your weapons and use them against the ever increasing number of zombies.

It looks like it might be pretty good fun, so if you're interested, then go to **goo.gl/lMLiK7** and see what you think. For just £3.99 it's certainly worth a play.

**Dex:** Dex is an excellent side-scrolling adventure RPG, where you control an augmented human in a steampunk future of puzzles and combat.

With non-linear gameplay, an open world ready to be explored and a character that can be upgraded with a variety of weapons and abilities, *Dex* is proving to be quite an impressive game.

If you think you can take on the mysterious AI behind it all, then spend £7.49 on the game's Steam page at **goo.gl/P3OlKp**.

***A bleak future, but can you make a difference with Dex?***

# Commodore Amiga: A Visual Compendium

**Sven Harvey checks out the book that was Kickstarted in more ways than one!**

**DETAILS**
- **Price: £29.99 (standard) /£49.99 (collector's edition)**
- **Publisher: Bitmap Books**
- **Website: www.bitmapbooks.co.uk**

After the Kickstarter campaign that took place last year, the Bitmap Books volume is now with backers and available for general sale at Funstock.

The book is a high-quality print volume of over 400 pages, being 23cm by 17cm, and my paperback edition came with not only a spot varnished dust cover over the reasonably thick card cover, but also a similarly weighted slipcase, The dust cover is a particularly nice addition to the book, and on the inside is a reproduction of the signatures that adorn the inside of the casing of the original Amiga (A1000.)

As originally described in the Kickstarter campaign and much more briefly on the Funstock and Bitmap Books websites, the book contains a series of double page spreads, usually of a single image from a game, along with a brief bit of text with quotes form the artist, a developer of the game or a mini review. The games are presented in chronological order, with games in each year, then sorted alphabetically.

Spread throughout the book there are also illustrated articles about software houses/publishers and developers, the birth of the original Amiga (the A1000, with concept art and further background information), a few pages on the Amiga's demo scene, plus the odd interview. There's also a fantastic centre section of the book, with some reproductions of the original box art from a series of games.

This is all topped off with some great photography of the home Amiga systems, a series

*The book in its card slipcase*

of tributes from artists to Deluxe Paint, and a foreword for the book by Stoo Cambridge, the former graphic artist from Sensible Software.

The book isn't without its flaws, but it requires you to be rather nit-picky, such as stating the A1000 was released in July 1985, when it wasn't actually released till the autumn of that year. It also states that the Amiga stopped being produced in 1994, but further units of the A1200 were produced after Commodore's collapse.

There are titles included that I find questionable when the likes of *F-29 Retaliator*, *TFX* and the ground-breaking *RoboCop 3* are nowhere to be seen, and apart from *Putty Squad*, no game released after 1997 is mentioned, with very few from 1995 and 1996, leaving out the likes of *Napalm*.

Deluxe Paint wasn't the only graphics package worthy of inclusion, and the choice of graphics for the spread for the games is a little strange in some cases – The Settlers, for instance, is a series of shots from the intro and nothing from the game itself (where, for me, the real charm lay!)

micro mart
Quality 9
Value 7
Overall 9

However, a lot of these niggles can be dismissed if you look at the title: it says Commodore Amiga, and the focus is very clearly on games and what could run on the home machines CBM released.

It's a fantastic book and comes very highly recommended, but it's not definitive and is screaming for a sequel – Beyond Commodore's Amiga, a visual and audio compendium, perhaps, with a CD as part of the book? It would be fantastic to see a similar book featuring some of the games missed, the big box Amigas, later AmigaOS machines and the likes of AMOS, Lightwave, and Amiga Forever. Regardless, this book deserves to be in the collection of anyone that remotely considers themselves a fan of Commodore's Amiga computer series, especially if they were an Amiga gamer.

You can find the book for sale over at Funstock's website: **goo.gl/zpWZxR**.

Sven Harvey has been our Amiga specialist for over 15 years drawing on his 24 years retailing computer and video games (25 Christmases, no less) and even longer writing about them

Amiga

# AN Other

## Ian McGurren checks out Yamaha's little secret

Ian McGurren is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Regular readers of this column may be aware of my predilection towards music making on the go, and my want to bring it to readers' attention. Having made music with non-mobile technology for 25 years, back then I'd never have thought that a mobile device could produce anything more useful than the beeps and boops of the Game Boy. However, since the release of smartphones and tablets of ever increasing power, I've had my tiny mind blown by a succession of fantastic audio applications every bit the equal of my pro gear. Normally, however, they aren't always cheap and are usually released to some fanfare. But this week I bring you not only one of the best apps I have used in ages, but one that was released with barely a murmur, and which is totally and unrestrictedly free!

Even if you haven't been a follower of musical instruments, you'll likely know that Yamaha, alongside motorbikes, boats, jetskis and many other things, manufacture highly regarded musical instruments. It's also dipped its toe into the music app waters from time to time, though usually as an accompaniment to its hardware currently on sale. It's Yahama's synth division's 40th anniversary this year, and to celebrate it's released the Synth Book app, a free app that has a written potted history of Yamaha's synth past. Oh, and there's also a full-blown synth just slipped in there...

It may not be the name on the app, but AN2015 is the most exciting part of it by a mile, and it's even fun for the musical layperson. It's a virtual recreation of an earlier Yamaha synth, the AN1X, itself a sort of virtual recreation of a classic synth called the Prophet 5. The Prophet 5 was a mainstay of late 70s to mid-80s pop and rock keyboardists such as Genesis's Tony Banks, Mike Lindup of slap funkers Level 42 and even the mighty Kraftwerk. While the AN2015 doesn't quite evoke the same time period, it does possess a similar warm and exciting sound.

At its core, AN2015 is a powerful polyphonic synth, complete with effects, plus an arpeggiator for those spiralling melody lines. For those of us who aren't adept at playing a keyboard on a screen, there's also a brilliant chord mode, where you can hit one of 12 'pads' to elicit a chord sound. The 12 in the group are set to be harmonically compatible too, and there are tons of sets of 12 to choose from.

Programming can also be as easy or as hard as you like. If you just want to tweak a few bits to your taste, then the screen is for you, essentially an XY pad that allows you to tweak a bunch of variables at one time, changing the sound drastically and easily. Run your finger over the screen to hear your bassline go from a rumble to a scream.

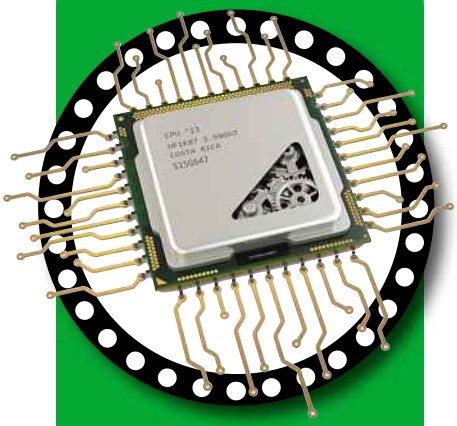
Alternatively, if you want to roll up your sleeves and dive in, the whole voice structure is in there for you to program sounds from the ground up, as if it were a regular synthesiser, or use one of the tons of included sounds as a starting point. Either way, the sound that comes out at the end is punchy, involving and even 'alive' feeling.

It doesn't stop there either, as the AN2015 can be controlled by midi for traditional keyboard playing and as part of a recording setup, as well as forming part of an iOS Audiobus session, meaning it can be used in a semi-professional capacity (i.e. you can make and record music with it and other mobile music applications, on the go).

I haven't been as impressed with an iOS synth like I have the AN2015 for a long, long time, and had it been £9.99, I would have declared it a steal. That it's not only free but squirrelled away in a nondescript app with barely any recognition is, at once amazing, bizarre and also disappointing. If you have five minutes spare and you like making a noise, you could do far worse than spending it with the Yamaha Synthbook and the AN2015.

# We Have The Technology

## Andrew Unsworth marvels at the world's first bionic eye implant



I'm ashamed to admit this, mostly because it makes me feel pathetically old, but I don't look forward to the future. Not because I'm afraid of it, although the odds of me finishing the day alive don't feel so heavily stacked in my favour any more and, unless I've sunk a few pints, it isn't because I suffer from the same idiotic enthusiasm for self-destruction I had as a young whippersnapper. No, the reason I don't look forward to the future is because for me it has already happened.

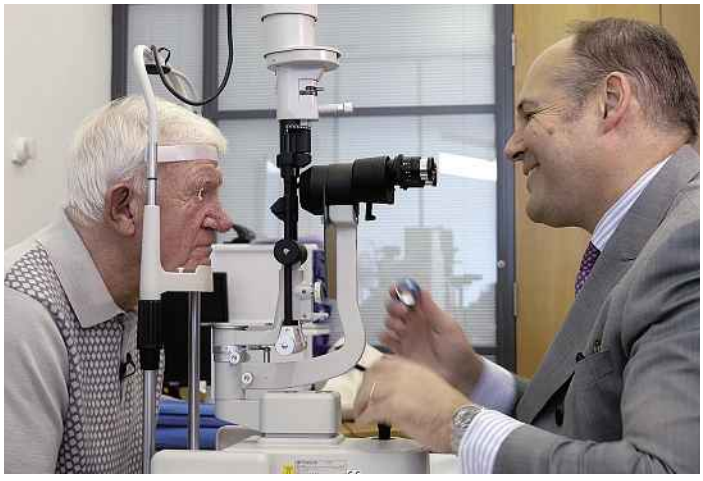
We live in an age when a small electronic device can not only contain more books than my local library but can order a pizza to my door in less than 45 minutes and accurately navigate to another part of the world without arguing with you about the route. This isn't even a new development either; we've been able to do these things for years.

Perhaps that's why I'm both struck dumb yet completely unshocked at the news that broke just a few hours before I typed this column, which is the remarkable story of Ray Flynn, who has been fitted with what the BBC News website (**tinyurl.com/orvvfu3**) describes as a "bionic eye".

Ray Quinn suffers from age-related macular degeneration, which is a condition that impairs his ability to see things in the centre of his vision. The condition affects over 500,000 people in Britain alone and stops them from enjoying common pastimes and everyday tasks such as reading and driving.

The technology is remarkable and reminds me of the 'glasses' worn by Geordi LaForge in *Star Trek: The Next Generation*. If you're unfamiliar with that show, Geordi LaForge is a visually impaired character who could only see by donning a pair of wraparound sunglasses.

The technology developed by the University of Manchester team doesn't look as stylish as Geordi LaForge's wonder-goggles, but it's phenomenally remarkable. According to the University of Manchester's press release (**tinyurl.com/qhz6fsj**), a camera sits on a pair of glasses and captures images. These images are then transformed into electrical impulses that are transmitted wirelessly "to electrodes on the retina surface where they stimulate the remaining cells and replicate the patterns of light for the brain."



Ray Flynn deserves much respect for working with the researchers and doctors who developed this new technology, not just for the time he's invested, but for having the sheer bottle to do it.

Tales of bionic people and cyborgs dominated the science fiction of my youth, and over the last couple of decades computer scientists, medical scientists and engineers have made great strides in the area. They've made increasingly sophisticated prosthetic limbs, grown neurons on microchips and even implanted chips within humans. I'm a child of the 80s, yet we're firmly in the realms of science fiction, albeit a realm in which, thankfully, our killer robots haven't yet become self aware. Intelligent and autonomous for sure but not sentient.

I'll still worry about the future, that's just my nature, but Ray Quinn's "bionic eye" proves there's never been a better time to be a human.

Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

# Alien Autopsy



*Aliens: Colonial Marines received scathing reviews, but Gearbox's Randy Pitchford maintains his studio tried to "make it as good as it could"*

**This week, Ryan checks out the one-of-a-kind multiplayer horror game, The Flock, and finds out what went wrong with Aliens: Colonial Marines...**

## Plug & Play

It sounded like the recipe for a potentially great game: a first-person shooter set in the universe of James Cameron's 1986 film, *Aliens*. And for years, *Aliens: Colonial Marines* kept teasing us with its potential, even as it threatened to linger in development hell. For one thing, *Aliens* had Gearbox Software working on it, the studio behind such acclaimed games as *Borderlands* and the *Brothers In Arms* series. With talent like that, what could possibly go wrong?

Lots, as it turned out. When *Colonial Marines* emerged in 2013, reviews were not kind. Sure, its dedication to recreating the sights and sounds of the *Aliens* universe, from the xenomorph-infested planet LV-426 to the distinctive rattle of futuristic guns, was there on the screen – but something had clearly gone awry with the mechanics. Aliens would behave strangely or simply run through walls. Missions were repetitive and generic, to the point where long stretches of the game had you shooting not at aliens but at anonymous soldiers in white hats.

As increasingly grim reviews rolled in, rumours began to emerge – reportedly from inside Gearbox – that the studio had diverted resources from *Aliens* to *Borderlands*, with development outsourced to an external team at TimeGate Studios. Matters took an even more extreme turn when a lawsuit alleged that the version of *Aliens* released in 2013 wasn't the same as the demo shown at E3 several months earlier.

Two years on, and Gearbox boss Randy Pitchford has been talking about *Colonial Marines*' development – and those rather toxic allegations:

"Some people invented this myth that if we had tried it would have been good, so we must not have tried," Pitchford told IGN. "Maybe we didn't spend the money on this game, maybe we spent it on another one that was good? So there's this rumour we'd embezzled money from *Aliens* and spent it on *Borderlands*. Firstly, that's absurd, and secondly the actual truth is the opposite, which is a lot more embarrassing."

Pitchford says that profits were taken from *Borderlands*, released in 2009, and invested in *Colonial Marines*, which by then was already about three years into its lengthy development.

"We took a huge amount of the money that we'd made off the first *Borderlands*, invested it into *Aliens* trying to make it as good as we could, and still ended up disappointing a huge number of people," Pitchford continued. "That's a whole other kind of failure!"

Pitchford also responded to suggestions that the final game differed from the demo shown at E3 by saying that was an exaggeration based on relatively minor visual changes: "In the final game, there's no blood on the ground and no glass shattering... and that's a scandal. Like, the tiniest thing."

Not all players will agree that the *Aliens* demo was only cosmetically different from the version released – a quick search for YouTube comparison videos proves that – but Pitchford maintains that he's proud of what his team produced. "I actually like the game," he says. "I still don't regret it – I wouldn't trade that experience for anything."

## Online

*The Flock*'s a game we've returned to several times over the course of its development, and for good reason: it looks like one of the smartest and most unusual multiplayer games on the horizon. It pits a large team of players – collectively known as the flock – against a single, far more powerful player, the Carrier who

*The Flock could be one of this year's most innovative multiplayer games, with its unique "capture the orb" concept and a dwindling population of monsters*

carries a deadly light (or "orb") that, when shone on the flock, will incinerate them. *The Flock* is therefore a constantly shifting power struggle for possession of the all-powerful orb, with players skittering around a shadowy map, hunting and generally scaring the life out of each other.

It's the natural evolution of ideas we've seen in such hits as *Left 4 Dead* and *Evolve*, but with less shooting and a lot more stalking. As if that wasn't an intriguing enough concept in itself, Dutch developer Vogelsap have added another twist: *The Flock*'s titular population of skinny creatures is actually finite. In other words, every time a member of the flock dies in the game, its population drops by one. Once the last member of the flock has died, the game is over – Vogelsap will withdraw it from sale, shut down the servers, and it'll never be played again.

It's the kind of experimental idea that a mainstream developer would never even consider; a finite population means a limited shelf life, which in turn means limited profits. Vogelsap describe *The Flock* as "a university project that ran out of control", which might partly explain why they're willing to try something so unusual.

Aside from ensuring lots of news coverage, *The Flock*'s limitations could affect the game in unpredictable ways. If every life lost pushes the game closer to its deletion, won't players work together to ensure survival? What will the atmosphere be like as the flock dwindles down?

*The Flock*'s still in its closed alpha stage, so we don't yet know population numbers; all developer Jeroen van Hassalt would tell *Eurogamer* is that, "the population is still being calculated based on the data we're retrieving from the closed beta [...] We will announce the number before launch. Safe to say, it will be substantial. The rest will be in the players' hands."

Van Hassalt also maintains that *The Flock*'s finite lifespan is a response to a common problem with multiplayer games: after a period of success, their users gradually drift off to new experiences.

"We want the game to have a climactic finale, after which people will fondly remember the game," van Hassalt says. "We aspire to write history. Players can be a part of that."

*The Flock* is scheduled for release later this year.

## Incoming

Released late last year, *Never Alone* was a simple, charming little platform puzzler relating the adventures of a girl and her Arctic fox in a frozen realm of spirits and monsters. Made with the involvement of Native Alaskan people, it was both a document of a culture and a disarming game. Since then, developer E-Line has been working away on its first expansion.

Called *Foxtales*, it offers a new story and three extra levels of puzzles and pitfalls, this time set against the backdrop of the Alaskan spring. Once again, it looks beautifully hand-crafted; the scenery's chilly, but the partnership between its central characters seems as heart warming as ever. It should be availalbe to download from by the time you read this.

*The charming Never Alone returns with an expansion called Foxtales. Prepare for more platforms, puzzles and engagingly frosty visuals*

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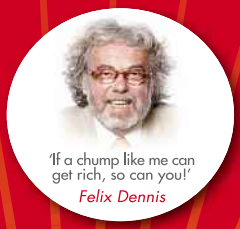


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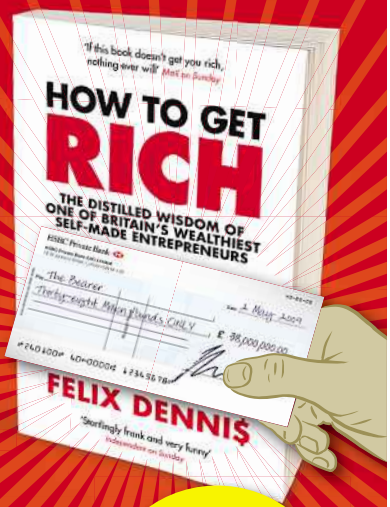


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**OPTERON 185 WORKSTATION**. 2.6GHz Dual-Core, Freezer 64, 4GB RAM, 160 + 300GB, CD-RW, DVD-RW, Floppy, network Card, Soundblaster , NVidea , Vista Business, fully updated & activated, with copy of install media & working activation number. £79 (P&P £15).
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**WD 500GB external USB HDD**. Excellent Condition. £20 inc. P&P.
*Tel: Michael Cunnane (01452) 303732*

**KINGSTON 120GB SOLID STATE HARD DRIVE**. For sale 120GB Kingston solid state hard drive model SSDnow V300 2.5" Sata3 - compatible with Sata2. Very fast drive. Perfect condition. Free delivery. PayPal accepted. Price £38.
*Email: geofry@tiscali.co.uk*

**ASUS P5QL-EPU Motherboard** - 775 Socket - DDR2. Tested and removed from a working environment, comes with I/O Plate. £45 inc Free Courier. Payment via PayPal.
*Email: info@jmcomputing.info*

**Laptop for sale**. Dell Latitude E5420 i5 2.5 ghz, 4GB RAM, 500GB hard drive, DVDRW, built in camera. Genuine Windows 7 64 bit professional. Only £150 plus £12 for next day delivery. Payment via Paypal or cheque or bank transfer, cash. Fantastic condition very fast.
*Tel: Dave Thomas (07828) 982930 or (01942) 706571*
*Email: davethomas96@aol.com*

**Laptop for sale**. HP NC 6400 Core 2 DUO 2.0MHz 3GB ram 80GB HDD, DVDCDRW Fingerprint reader, Fantastic and fast . Windows 7 32-bit professional. Only £60 plus £12 for next day delivery.
*Tel: Dave Thomas (07828) 982930 or (01942) 706571*
*Email: davethomas96@aol.com*

Asus Z97 Gryphon Armor Kit. Steel backplate with plastic top and auxilliary fan. Also some minor plastic bits. £20. Email for more details.
*Email: graham_rocknell@yahoo.co.uk*

**Laptop for sale**. HP Compaq 6910p Core 2 DUO T7300 2.0mhz 3gb ram 80gb hard drive DVDCDRW Fingerprint reader fantastic and fast , Genuine win 7 35 bit professional Only £60 plus £12 for next day delivery. Fantastic condition, very fast. Tel: Dave Thomas (07828) 982930 or (01942) 706571 Email: davethomas96@aol.com

**PC Desktop Ram (DIMM)** Memory. 64MB Siemens PC100-322-620 MT8LSDT864AG-10CZ5. £8.
*Tel: Gordon (01314) 660205*
*E-mail: scobieg09@gmail.com*

**WD 3TB internal Hard Drive.** Excellent Condition, £65 inc P&P.
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**WD Internal SATA 3.5" 2TB** Hard Drive. Excellent Condition. £37.50 included P&P. Flat screen monitors. Mainly 15" £20+p&p and 17" £30+p&p but have others on request. When packing I will make sure they have lot of padding to reduce rick of damage. Please email or call me for more information.
*Tel: David (01616) 888119*
*Email: pcmadnessltd@yahoo.co.uk*

**IBM Thinkpad T30 laptop** for spares or repairs. Excellent condition, but does not bootup. Not sure why. Could be an easy fix or for parts/spares.
£15 plus P&P.
*Tel: Gordon (01314) 660205*
*E-mail: scobieg09@gmail.com*

**Webcam (Trust Spacecam)**. Boxed with CD of installation software and instruction manual. Perfect condition. £10.
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*E-mail: scobieg09@gmail.com*

**For Sale: HP Photosmart C4585** All-in-One multifunction colour printer. Perfect condition. Includes software discs and manual. £20
*Tel: Gordon (01314) 660205*
*E-mail: scobieg09@gmail.com*

**Western Digital Cavier SE** Desktop Hard Disk Drive 160GB. In Perfect condition. Only £10
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*E-mail: scobieg09@gmail.com*

**Netgear DG834N** Rangemax Next Wireless N Modem Router kit. Excellent condition complete with power supply, network cables, telephone cable, ADSL filter and setup CD. £10.
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*Email: david@ewles.gb.com*

**Toshiba Portage i5 laptop**. 2.5GHz Model R830-13c 4GB RAM, 320GB HDD. Wi-Fi, fingerprint scanner, HDMI ouput. Sold on eBay for over £200; only £150 plus £15 p&p. Bargain. Great condition. Very light.
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*Email: davethomas96@aol.com*

**Seagate Barraucda 250GB SATA Hard Drive 3.5"**. Tested and removed from a working environment. £12 inc Free Courier. Payment via PayPal.
*Email: info@jmcomputing.info*

**LAPTOP HARD DRIVE**. 160GB SATA 2.5". WESTERN DIGITAL. Model: WD1600BEVT. Fully tested. Perfect working order. Partitioned and formatted NTFS. Free postage. Price £22. Paypal accepted.
*Email: geofry@tiscali.co.uk*

Asus A8V motherboard, socket 939. Clips holding CPU cooler broke, CPU overheated & shut down. M/B should be OK and there is 4GB of ram on board. Free, collect only. North Wales.
*Tel: (01286) 678584*
*Email: gw7hav@googlemail.com*

**DESKTOP HARD DRIVE**. 640GB Western Digital 3.5" SATA model WD6400AAKS. Perfect working order. Partitioned and formatted. Only used as back-up drive. Free delivery. Price: £33.
PayPal accepted.
*Email: geofry@tiscali.co.uk*

**4x 1 GB DDR2 RAM** (Ocz Nvidia SLI PC2 6400 epp 4-4-4-15) for Sale. £40.00 for all 4 + Post/Packing. In perfect working order.
*Email: ken.toole1@virginmedia.com*

**Vintage Amstrad PC1512 HD20**. Colour Monitor 20MB Hard Drive 5.25 Floppy Original Amstrad Disks Manuals spare Keyboard and Mouse. This is a rare fully functioning collectable. £60.
*Tel: (01949) 876235*
*Email: hc4203@gmail.com*

**4x 1GB DDR2 Ram** (OCZ Nvidia SLI PC2 6400 epp 4-4-4-15). £40.00 for all 4 + Post/Packing. Perfect working order.
*Email: ken.toole1@virginmedia.com*

**Laptop Hard Disk Drive**. Fujitsu. 20GB. Excellent condition: £10.00.
*Tel: Gordon (01314) 660205*
*E-mail: scobieg09@gmail.com*

**XFX GeForce Nvidia 8800Gts** Graphics Card For Sale. £40.00 + Post. In perfect working order
*Email: ken.toole1@virginmedia.com*

**Corsair Vengence 16GB (2x 8GB) DDR3 RAM** CMSX16GX3M2A1600C10. Never used. Selling due to wrong voltage, these are 1.5V and I needed 1.35V. Asking £85 inc. postage to the UK. *Email: fabstock1@gmail.com*

**HP Microserver n40l** / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003. This HP n40l Microserver is in excellent condition and comes with Windows 7 re-allocated, activated & updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/COAs. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16GB memory and up to five drives. See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection. Delivery might cost £8 via Hermes, maybe much more to Highlands/Islands. Payment by Cheque OK subject to clearing, Paypal at £25 additional (to cover their fees). *Tel: (07794) 528857 Email: it_central@ntlworld.com*

**CD Optical Drive** for installation in desktop PC Only £10. *Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com*

**Used Asus Wireless Router** for sale. Dual-band 4 x GB Ethernet Wi-Fi RT-N66U N-900. £65.00 O.V.N.O. Selling cause I have no need for it since upgrade to BT Home Hub 5. *Email: beme12355@googlemail.com*

Intel Core 2 Duo E4400 2.0GHz £10, Intel P4 630 3.0GHz £7, Intel Celeron M 350 1.3GHz £5, Intel Celeron Mobile Dual core T1500 1.866Ghz £6, Intel Pentium 4 630 HT 3.0Ghz 2MB cache £8, AMD Athlon 64 3200 £5 Athlon 64 3500 £6 Athlon 64 3200 Dual core £10 postage £2. *Tel: Jeremy Gill (02089) 430683 Email: arthur.pewty1@virgin.net*

**SKY PLUS and SKY PLUS HD REMOTEs.** Original £7.50 + P&P please email or call me for more information. *Tel: David (01616) 888119 Email: pcmadnessltd@yahoo.co.uk*

**US Robotics External 56K Message Modem**. Includes V.90 56K Standard X2 Technology. Boxed and complete. Perfect. £25 + p&p. Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com

**2 x 2GB DDR3 1600 MHz RAM**. Recently taken from a 2012 mac mini. As new £25. *Email amstereofan@gmail.com*

**Custom Built modified watercooled gaming desktop**. i5 4670K, R9 280X, Silverstone RV-01 USB3, 1000W PSU: parachord sleeving, Z87M OC Formula, 8GB Kingston Fury 1866MHz, 180mm and 120mm Radiator. Yellow and Black colour scheme! No Storage. Email for pics and info. Buyer collect: Gloucestershire. £800 ono. *Tel: Adam (07426) 874117 Email: flaming_monkey95@hotmail.co.uk*

**CPU sale**. Intel Core 2 Duo E4400 2.0GHz £10, Intel Pentium 4 630 3.0GHz £7, Intel Celeron M 350 1.3GHz £5, Intel Celeron Mobile Dual core T1500 1.866Ghz £6, Intel Pentium 4 630 HT 3.0Ghz 2MB cache £8, AMD Athlon 64 3200 £5 Athlon 64 3500 £6 Athlon 64 3200 Dual core £10 postage £2. Tel: Jeremy Gill (02089) 430683 *Email: arthur.pewty1@virgin.net*

**Kingston HyperX 2x2GB DDR2 1066MHz RAM**. Tested and removed from a working environment. £45 inc Free Courier. Payment via PayPal. *Email: info@jmcomputing.info*

**2x 512MB PC3200 DDR400**. Two sticks were removed from working system. £5, plus £1 P&P. *Tel: Alan (02084) 202322 Email: alan@asandco.co.uk*

**DDR2 memory sale**. 2 x Nanua PC2 3700 256MB £6 pair, 2 x HP PC2 4200 256MB £7 pair, 4 x HP PC2 4200 512MB £10 pair or £18 for four. Tel: Jeremy Gill (02089) 430683 *Email: arthur.pewty1@virgin.net*

**Asus M2N2-SLI Deluxe motherboard bundle**. With AMD Athlon 64 4000 CPU, 4GB of Corsair RAM plus fan, backplate, manual and driver CD. £40 *Email: david.white38@ntlworld.com*

**IBM/LENOVO SFF BASEUNIT**. P4/ 2.8 H-T, 2GB RAM, 40GB Hard Drive, CD-Rom, 10/100 Network, sound, USB, Clean install XP-pro, fully updated, Office Suite, Anti-Virus, & all usual utilities, COA Licence Sticker & Install media, £25 *Tel: Pat (07710) 348638 Email: pat4cars@aol.com*

**FUJITSU-SIEMENS MINITOWER.** Pentium D 2.8 Dual-Core, 2GB RAM, 80GB Hard Drive, DVD-RW, Gigabit network, sound, Clean Install XP-pro, fully updated, Office suite, Anti-Virus & all usual Utilities, Legal COA sticker & System Image. £35 *Tel: Pat (07710) 348638 Email: pat4cars@aol.com*

**DELL OPTIPLEX GX240 SFF. P4/1.6,** 20GB hard Drive, 768MB RAM, CD-Rom, 10/100 network, Sound, Front USB, Clean install XP-pro, fully updated, works OK but slow by modern standards, £15. *Tel: Pat (07710) 348638 Email: pat4cars@aol.com*

**56kb Fax Modem External**. £10. *Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com*

**LG Flatron W2246S 22" monitor** with power and VGA leads. No dead pixels in very good condition. £50 Buyer Collects (Verwood, Dorset) *Tel: (01202) 826057 Email: geoffandcynth@themailspot.com*

**2x 1GB PC2100-648**. These two matched sticks were removed from one of my redundant systems. Plus one PC2700 (DDR 333Mhz) and one 512Mb PC3200 DDR400 stick. All for £5 plus £2 P&P. *Tel: Alan (02084) 202322 Email: alan@asandco.co.uk*

**Very rare Viking IBM 16MB Dram Card** (15109 66G5109) for Compaq, IBM Thinkpad, Etc Laptop Only £20 *Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com*

**TP-Link 54Mbps 4-port Wireless G Router**. Perfect, boxed. Model: TL-WR340G. £20 plus postage. *Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com*

**Intel Core 2 Duo E4600 3GHz** 775 Socket Processor. Tested and removed from a working environment. £10 inc Free Courier. Payment via PayPal. *Email: info@jmcomputing.info*

**Addon Wireless LAN USB 2.0 54Mbps 802.11g Adaptor**. Boxed w/ manual and software: £9. *Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com*

**CD Stomper CD/DVD Labelling System:** Software, Labels and Label Applicator. Boxed. Unused. £9. *Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com*

**DIR-615 Wireless N Router**. Boxed, brand new. £30. *Tel: Gordon (01314) 660205 E-mail: scobieg09@gmail.com*

**Laptop DDR2 memory sale**. 2 Corsair Value Select 533mhz 1GB £18 pair, 2 Hynix 800mhz 2GB £26 pair, 2 Generic 533mhz 1GB £15 pair,1 Generic 800mhz 1GB £10,1 Nanua 666mhz 1GB £, 1 Samsung 666mhz 1GB £8. Postage included *Tel: Jeremy Gill (02089) 430683 Email: arthur.pewty1@virgin.net*

**2x 120GB Maxtor DiamondPlus 9** Drives plus 1x 80GB DiamondPlus 10. Can be supplied with 2x plug-in caddies. Reasonable offers please.
*Tel: Alan (02084) 202322*
*Email: alan@asandco.co.uk*

**HP Elitebook 8760w i7** 2820QM @ 2.2GHz 32GB RAM 750GB HDD Quadro 4000M GPU. Only 2 small marks on whole machine. Cost £3500 when new. £900 ONO
*Tel: (07772) 926632*
*Email: stedaley19@gmail.com*

**WD 2TB desktop HDD.** Formatted ready for an OS. Runs very nicely. New laptop means desktop items must go! £40 inc. tracked postage.
*Tel: (01619) 501218*
*Email: jmbest2@sky.com*

**Toshiba C500D-B-11 laptop**. Almost new cost £279 will accept *£150ono*
*Tel: (01217) 535324*

**Intel 3930K** processor. Used, but not overclocked. No box or fan. £220 ono. Will ship to UK address.
*Tel: Tim (01623) 624509*
*Email tim.stirland@btinternet.com.*

**Amstrad PcW 9256** in good working order with software. Offers.
*Tel: John Adams (02088) 641202*
*Email: meeching@uwclub.net*

**Asus P8Z68-v LX socket 1155** motherboard. Original box 1/0 cover user guide driver disk fitted core i3 2100 CPU 3-1GHz and 8GB PC1300 memory. No fan. Working fast and fine. £125 + free postage.
*Tel: (01619) 501218*
*Email: jmbest2@sky.com*

**ASUS P5B Motherboard** - 775 Socket - DDR2. Tested and removed from a working environment, comes with I/O Plate. £35 inc Free Courier. Payment via PayPal.
*Email: info@jmcomputing.info*

**SAMSUNG GALAXY Tab 3** for sale. 2mths old, 8GB, wi-fi, £80 open to offers. Willing to post at a charge.
*Tel: Christine (01386) 831836*

## HARDWARE WANTED

**Trying to breathe life back into an old machine? Why not submit a wanted ad and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?**

WANTED: PC Tower case (beige colour if possible) to rehome an Amiga A1200 vintage computer. The Amiga motherboard is H 410mm x L 190mm (H 16" x L 7.5"). PSU not an issue but if available 250 watt more than enough.
*Tel: Bill (07742) 061569 or (02641) 769503.*

**WANTED: Fractal Design Define XL** full tower case. R1 (original version) in black.
*Tel: (01670) 860146*
*Email: mm@tectron.co.uk*

**WANTED: Working Dot Matrix Printer** in Good Condition. Thanks!
*Email: printer.20.odaily@spamgourmet.com*

**WANTED: Acorn computer** either an A5000 or A7000. Also book on teaching yourself binary.
*Tel: (07817) 861011*
*Email: Johnhaviland73@gmail.com*

## SOFTWARE FOR SALE

**Do you have old software that you simply don't use? Why not advertise with us and see if anyone else can make use of it – you may well be surprised to find that someone is looking for it!**

**Adobe Photoshop Elements** and Premiere Elements 12 Full Version - Windows/Mac. Original Boxed CD with unused product key. £47.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

**PCB design software** 127 layers, schematic entry, PCB entry, PCB to Gerber file converter, output to printer. £9.99
Tel: Nigel Wright (07967) 527693
Email: cresswellavenue@talktalk.net

**Cyberlink PowerDVD 12 Standard**. Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50
*Tel: Ian (01932) 856971*
*Email: a2345@btinternet.com*
Microsoft Office 2013. Original Software only £100.
*Tel: Gordon (01314) 660205*
*E-mail: scobieg09@gmail.com*

**Sim City 2000**. Boxed and original. Classic gaming. £15.
*Tel: Gordon (01314) 660205*
*E-mail: scobieg09@gmail.com*

Norton Family Premier 2.0. Runs under Windows 8, 7, Vista or XP, Original Symantec unused product key £15.
*Tel: Ian (01932) 856971*
*Email: a2345@btinternet.com*

Nuance Omnipage 18. OCR for Windows 8, 7, Vista or XP, Original CD with unused product key £25.
*Tel: Ian (01932) 856971*
*Email: a2345@btinternet.com*

Acronis True Image Home 2012. Bootable CD. Application runs under Windows 8, 7, Vista or XP. Original Acronis CD with unused product key £5.
*Tel: Ian (01932) 856971*
*Email: a2345@btinternet.com*

## SOFTWARE WANTED

Wanted: I have a BCL 2.4g Wirless Gaming Mouse, Model: RF0P77 (3v 7ma) but no Drivers. Can someone help with a copy of the Original Drivers for this Wireless Mouse>??
*cliffordevans603@btinternet.com*

Wanted: Driver disc for Toshiba L30-11D PSL33E laptop. Laptop useless without drivers but only worth £40, so cannot pay a lot.
*Tel: John Udall (01384) 824494*
*Email: john.udall@blueyonder.co.uk*

### IMPORTANT BUYING ADVICE

**We work very hard to police our classified ads, and make them as secure as possible. However, please do your bit too and use the following guidelines:**

• **Never - NEVER -** pay by bank transfer or post out cash, unless you know the trader already, or are sure it is okay to do so. Pay by cheque, Paypal, Nochex etc wherever possible.

• Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing editorial@micromart.co.uk

• Keep copies of all correspondence

• When sending out goods, at the least obtain a certificate of posting from the Post Office

**If you are in any doubt, feel free to send us a mail via editorial@micromart.co.uk.**

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# ASK AARON

**Meet Aaron Birch. He's here to help you with any general upgrading, software and system building problems. He's got advice aplenty, and you're very much welcome to it!**


**Send your questions to:**
**Aaron Birch**
**Micro Mart**
**Dennis Publishing**
**30 Cleveland Street**
**London**
**W1T 4JD**

**Contact Aaron by email at:**
**aaron@micromart.co.uk**


**Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.**

Aaron

## (In)DirectPlay

As an older computer user, I've been playing games for a long time, and some of my favourites are real-time strategy titles. In particular, I especially like the classic games in the genre, such as *Dune II*, *Command & Conquer* (the originals, including *Red Alert*), and *Age of Empires*.

I still have all of my original discs for these games, and recently I decided to give them a go again, starting with *Age of Empires III*. However, this urge was stopped in its tracks when I came to try installing the game on my Windows 8 laptop.

When I tried to install the game, I found that I was unable to, as a message told me that DirectPlay was not supported by Windows. This stopped the installation, and I could go no further. I tried again, but got the same problem.

I'd really like to play *AoE* again and would welcome any help you could provide to get me back to my armchair general best.

***Graham***

*I'd have to agree with you here, Graham. I also find the classic RTS titles to be among the best in the genre, and they still hold up today. The problem, however, is their various compatibility problems with today's operating systems, and Windows 8 has certainly not made things any easier.*

*Older games often run into problems with more up-to-date versions of Windows, and in some situations it's nigh-on impossible to get them running. Age of Empires III is one such example, as it uses an old technology called DirectPlay, which was discontinued. Windows 8, by default, doesn't support this, but there is a way around it.*

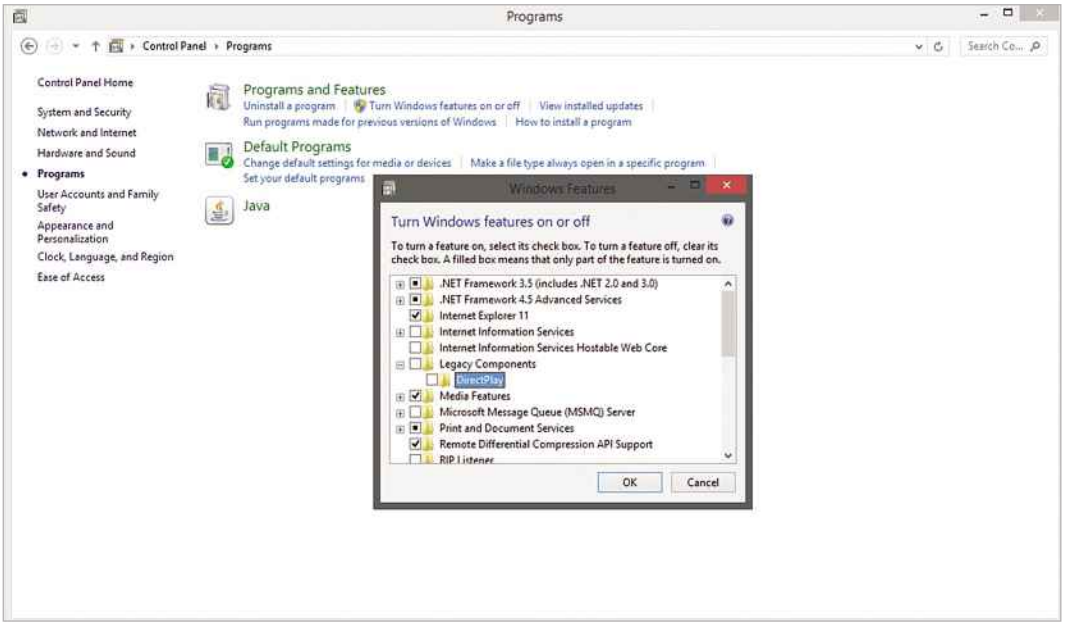
*Fire up your laptop, and when you're at the desktop, press Windows+X and press P to open up the Control Panel. Next, click Programs and then select 'Turn Windows features on or off.' A new window will open showing you various Windows components, one of which will be titled Legacy Components. Expand this and you should see DirectPlay. Place a tick next to it and then click OK. Windows will make the required changes for you, adding support for the legacy API.*

> **Older games often run into problems with more up-to-date versions of Windows**

*Once it's done, try to reinstall Age of Empires III again, and you should have no problems. The game should install and work correctly. You'll soon be marshalling your troops and sacking enemy castles in no time.*

*Obviously, this solution is fairly situational, and there are many other older games that also suffer from compatibility problems. Sometimes there are ways around this, and sometimes there's simply no way to get them working without major work. This can include major changes to the game's assets and/or code, and is a practice best left to professionals. This is why sites like* **www.gog.com** *are so popular, as it makes older games available once more, fully compatible with modern systems.*

***Sometimes getting old games to work is simply a matter of enabling legacy options***



## 100% Avast

I've been a user of Avast anti-virus for quite some. I used to use AVG, but after experiencing all sorts of problems with it, I moved to Avast, which ran better and was more reliable – until recently.

I've been having problems with my internet connection, which has been driving me crazy. Occasionally pages just won't load, and even my whole system seems to slow down, with my browser becoming unresponsive. After trying all sorts of things to fix it, including contacting my ISP and going through all sorts of tests (and engineers even came out), the problem didn't go away.

One day I was using another, unrelated program and noticed that my PC was running very slowly. I tried to go online, but pages failed to load. I was concerned it was the program I was using that had crashed, so I opened up Task Manager and was shocked to see my CPU usage was at 100% and that Avast was using all of it. I wasn't running a scan or even updating it, but it was using 100% of my processor.

I ended the task (which took several tries) and shut down Avast. Eventually, my CPU usage dropped and my PC returned to normal, as did my internet connection. The led me to believe that all my previous problems were down to Avast and not my ISP or any other programs as I'd first thought.

I don't really want to return to AVG, as I still think it's not as good as it used to be and I do like Avast, but I'm now not sure what to do. Do you have any advice?

***Ed***

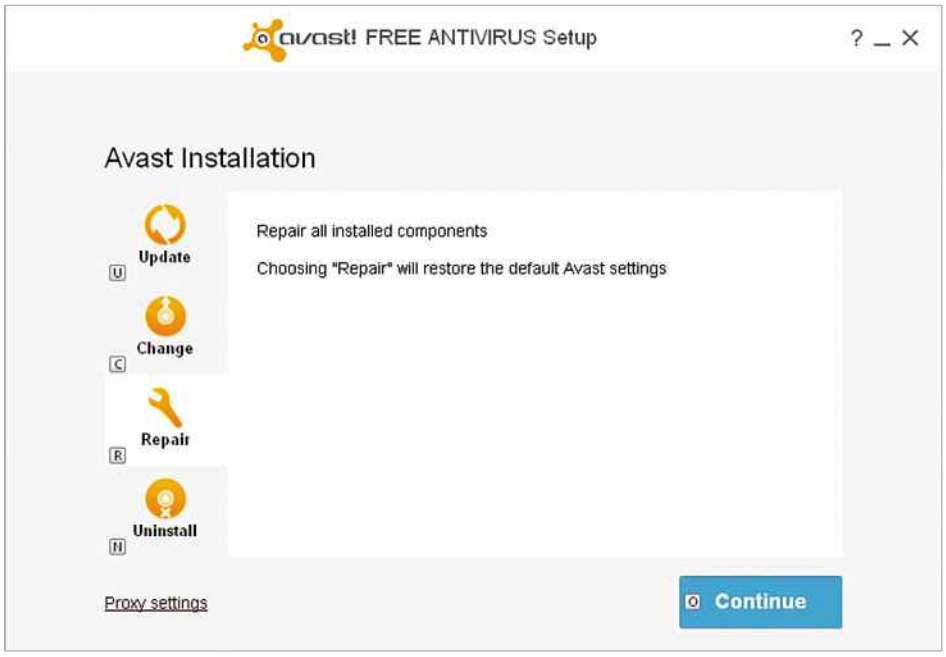
*You're actually not the first person I've seen have this problem, and it would appear as though others have also run into this CPU-hogging problem with Avast. Avast's support doesn't seem to have been too helpful with the problem, but many users solved the problem by uninstalling Avast, using the Avast clean-up tool to remove all traces of the application and then installing either a new version or a beta version (this was tried in January, however, so may no longer be relevant). You can download the removal utility at* ***www.avast.com/en-au/uninstall-utility****. For best results here, I'd recommend rebooting after the uninstallation and reinstalling after you've restarted the PC.*

*Alternatively, some users found that a simple repair of the installation fixed the problem. This can be done by going into the Control Panel, then selecting 'Uninstall a Program'. Once here, locate Avast and click to uninstall it. When Avast's dialogue box appears, select the Repair option and follow the on-screen prompts.*

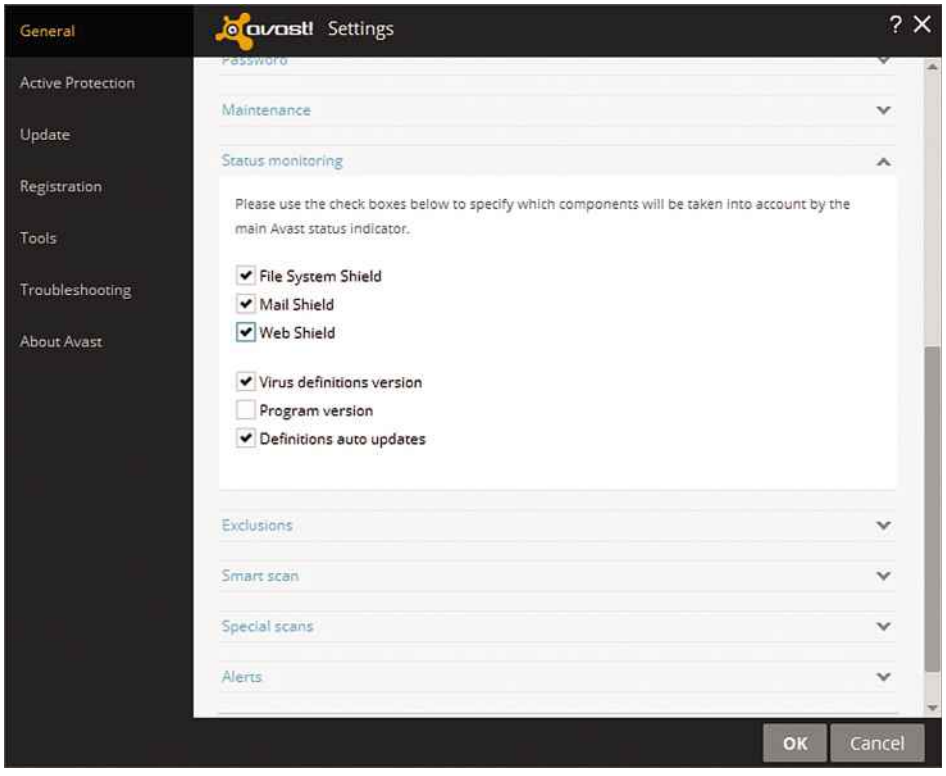
*Lastly, you can disable the Web Shield tech the program uses, as this has been known to cause trouble for some users. Previously, it was advised to do this by editing the Webshield.ini file found in C:\ProgramData\AVAST Software\Avast, adding the lines:*

*[General]*
*UseStreamFilter=0*

*However, this should no longer be needed if you're using a later version, and you can simply go into Avast's interface and into Settings (I've included it here just in case). Under General select Status Monitoring and uncheck the box next to Web Shield. This will disable the feature and may help solve your problem. Good luck.*




▲ *A repair installation of Avast can help solve some problems, including excessive CPU use*




▲ *Avast's Web Shield has been known to cause some problems for users on occasion*

# ASK JASON

**Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs**


**Send your questions to:**
**Jason D'Allison**
**Micro Mart**
**Dennis Publishing**
**30 Cleveland Street**
**London**
**W1T 4JD**

**Contact Jason by email at:**
**jason@micromart.co.uk**


While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

## Getting In Trim

I've ordered the parts for a new PC, including an SSD. I'll be running Mint 17.2, so I've been online to see if Linux needs any SSD-related optimisations. And oh my word! I've come across codes for this, codes for that, and no end of ideas on how best to proceed.

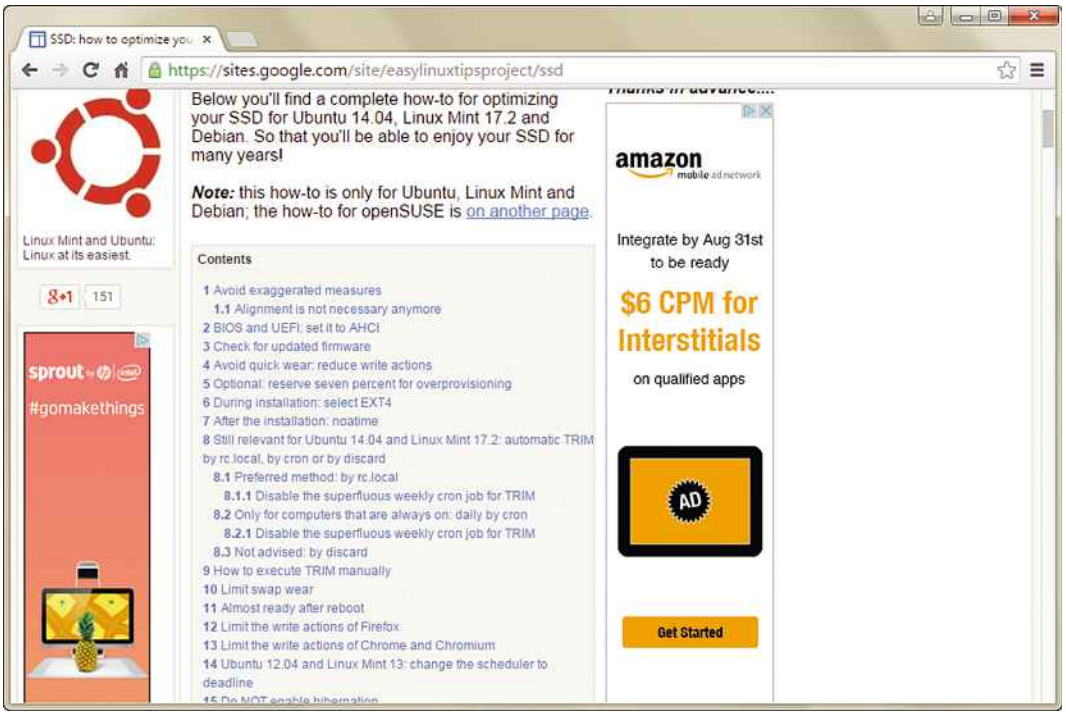
Surely it can't be that convoluted? Windows optimises itself for SSDs practically automatically – TRIM and all the rest. I've had no problems with Mint in the past, but that was with an HDD. I'm now getting concerned. Please give me some of your no-nonsense advice!

***Gareth Eaton, Gmail***

*I may not be the best person to ask, Gareth! Keep this to yourself – it'll win me no friends – but I gave up on Linux years ago. Linux as a desktop OS, that is. I've tried many, many times with many, many distros, going back almost 20 years. Linux is a roaring success when it comes to servers, embedded devices (routers and the like), and of course Android. But as a desktop OS, my view is that – well, perhaps I'd better keep quiet about that.*

*As luck would have it, though, your SSD query has cropped up recently on the Micro Mart forum. Cast your eyes over this thread:* ***goo.gl/5NSuai****. You don't need to register in order to read it, but you will if you want to participate (and I urge you to do so). The thread links to the following guide on the 'Easy Linux tips project':* ***goo.gl/NNp9qJ****. Is there lots of gobbledygook to type into a terminal window? Of course there is.*

***I'm saying nothing...***




## The X Factor?

I'm a gamer, and at Christmas I upgraded my PC from a Core 2 Duo rig to one using a Core i7. However, because of limited funds, I carried my old graphics card over, a Radeon HD 6970. It's now time to upgrade that too, and I've got my eye on AMD's new Radeon R9 Fury and Fury X. The Fury X, with its liquid cooler and compact size, seems awesome, but maybe it's all a bit over-the-top. There are also complaints about coil whine. Apart from some case space, what would I lose by going for the plain Fury? Is the Fury X really worth the extra money?

***Joe, Virgin Media***

*It was hoped the R9 Fury and R9 Fury X would put AMD back on the map, as the company's last few flagships have played second fiddle to Nvidia's. And that hope has been realised. The Fury X runs neck-and-neck with the GeForce GTX 980 Ti, its rival, and the Fury actually pulls ahead of the GeForce GTX 980, its own rival.*

*The only real difference between the Fury and Fury X is the rendering configuration. In terms of shaders:TMUs:ROPs, the Fury packs 3,584:224:64 and the Fury X packs 4,096:256:64. Also, the Fury X clocks in at 1,050MHz, whereas the Fury drops down to 1,000MHz (though some cards are pre-overclocked). In practice, Joe, this means the*

*Fury is roughly 7% slower. To see some numbers, read this review at PCWorld (unrelated to everyone's 'favourite' electrical retailer!):* ***goo.gl/ec2hY0****.*

*AMD has got the pricing right too. The Fury starts at about £440, compared to £380 for the GTX 980, and the Fury X starts at about £530, compared to £500 for the GTX 980 Ti. The AMD cards actually carry a premium currently – they're hot sellers and many retailers are awaiting new stock. The Fury offers the best value, being around 17% cheaper but nothing like 17% slower. I don't think you'd regret buying one – it's still going to plough through anything you put it its path, probably even at 4K.*

*Make sure your case has the necessary space and air-flow, though. Even with three fans, the card will run hot. And if you draped some lettuce over it and sprinkled on a few jalapeños, you'd be able to serve it up at Subway – Fury cards are pretty much a foot long.*

*The Fury X runs warm at most, and of course its cool factor is at absolute zero. But don't be fooled by the compact size. Yes, the cards are only 7.6" long, but you'd still need to fit the external 120mm fan and 2"-thick radiator. There are no space advantages, not really.*

*Regarding the Fury X's noise – which allegedly isn't coil whine (so what is it?) – AMD claims newer cards are fixed. Reports from buyers and reviewers challenge that. If you really want the best, Joe, you'd no doubt learn to live with it, and in any event AMD reckons the noise is inaudible in the context of a running PC. In my experience, though, coil whine (or whatever) is annoying enough to pierce through the crash of a convoy of lorries shedding multiple loads of beer bottles.*

***The Radeon R9 Fury X is cool in more ways than one***

## Purple Haze

I have an HTC One smartphone, the M7 or 801n model, and just recently I've noticed that pictures taken in low light have a pink tint all over them. Looking online, this seems to be a common problem, and there are all sorts of suggested fixes. I've tried most of them and not really got anywhere. Will the problem get worse? What can I do?

***G. Roper, Leicestershire***

*Yes, the pink tint is a common problem. In fact, I believe nearly all M7s have it – or will eventually. For some reason, it seems the camera's image sensor overheats, and this damages the 'photosites' – the pixels.*

*Heat kills everything – not just in the electronics world – and image sensors hate it. This is one reason why video-recording on phones and many dedicated cameras is time-limited, often to ten- or twenty-minute bursts or even just five-minute bursts in the case of 4K. Sensor heat not only creates noisy images but can also cause permanent damage.*

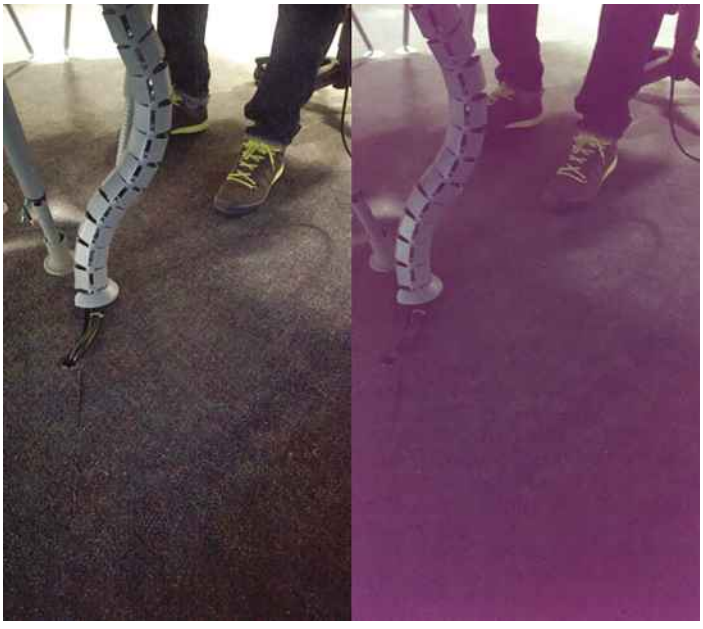
*I don't know exactly why the M7 has this issue. Maybe the sensor is poor quality; maybe its location means it's constantly exposed to excessive heat; maybe the damage occurs only when the phone's being pushed (and gets hot). HTC knows about the fault, and it's not made the same error with the newer One devices, the M8 and M9.*

*The problem develops over time, and it gets progressively worse, eventually affecting all images, not just low-light ones. Maddeningly, even when the image sensor's replaced, the fault comes back. Clearly there's a dire design flaw somewhere. It's definitely not a software problem, though some M7 owners claim the pink tint only appeared after they'd updated Android. I'd say that's coincidental, or it could be that the extra heat – updates generally run a phone hard – was what let the rot in.*

*Messing with the camera's settings can sometimes lessen the defect – for example, lowering the ISO speed, saturation, and exposure compensation. However, doing that, especially in low light, just ruins the pictures in other ways. It's not a solution.*

*As we're talking about an acknowledged design problem, it's my understanding that HTC is obliged to take faulty M7s in for repair, even if they're out of warranty. Get hold of an assistant on HTC's live-chat facility:* ***goo.gl/tYj00w****. Play hard. I've heard that HTC might try to charge $90 on out-of-warranty phones – don't stand for it. Shout – USE CAPITALS. Naturally, you'll be without your phone for a couple of weeks, and six months down the line you could be back to square One…*

***Is this what Jimi Hendrix was on about?***



# Crowdfunding Corner

**Thanks to Bluetooth, cable-free audio is increasingly an important part of the computing landscape – and thanks to Kickstarter, you can have Bluetooth audio wherever you are, whether you're at home or out and about**

## Little British Monitor

Designed to provide professional-quality audio without the tyranny of cables, this aptX Bluetooth-enabled speaker uses the same high-end designs found in professional audio monitors, then packs it inside a well-crafted exterior to create something that looks as good as it sounds.

Aimed at everyone, from the casual user to the committed audiophile, this speaker can be bought as a finished product or as a build-it-yourself kit so you can be truly certain that it's been assembled with care. Suitable for all skill levels, it'll help you learn all about speaker construction and get a decent product at the end of it.

Of course, all this high-end engineering isn't cheap, and while lower backing tiers exist with partial kits and early bird pricing, it generally costs £299 to get everything you need to build a pair of speakers yourself. It's expensive, yes, but if you're in the market for something unique and high-fidelity, then it's probably worth the money.

In any case, the project is aiming for a £9,000 goal, and it's already hit over £6,000 at time of writing. With more than three weeks to go, we can be more or less certain that it'll end up reaching its target.

**URL: kck.st/1Kkd3FI**
**Funding Ends: Monday, 17th August 2015**

## HELIX: Wearable Cuff with Stereo Bluetooth Headphones

If you haven't noticed, wearables are the current big thing in tech, and that means they're turning up everywhere on crowdfunding platforms as well. The Helix is just one example of that. Unlike most, this wristband isn't designed to track activity or deliver your text messages – it's a storage medium and control mechanism for your headphones.

Created with fashion and functionality in mind, the Helix wristband means you'll never have to fumble in your pocket for a tangled set of headphones again. The wireless earbuds are stored inside your wristband and are attached to a Bluetooth dongle and combined power/volume control. The wristband itself has a magnetic fastener that allows it to sit comfortably on any size wrist. When it's docked, you're still able to check the connection and power status, and when you're using the headphones, the wristband is comfortable and stylish enough to leave in place.

At time of writing, you can get a Helix for as little as $99 (£63) – not much more than a pair of high-end headphones – but that price is limited to a thousand units, and a quarter have already gone. If you miss it, you should be able to get in the $149 (£95) tier, which is still $50 (£32) below the planned RRP. At these prices the project's goal ($100,000 / £64,000) shouldn't be at all beyond reach, so if you're looking for a pair of new headphones, this might be what you need. You just have to hold on until they ship in, er, December this year. Still, they should be worth the wait.

**URL: kck.st/1HIN7Qi**
**Funding Ends: Friday, 18th September 2015**

***Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!***

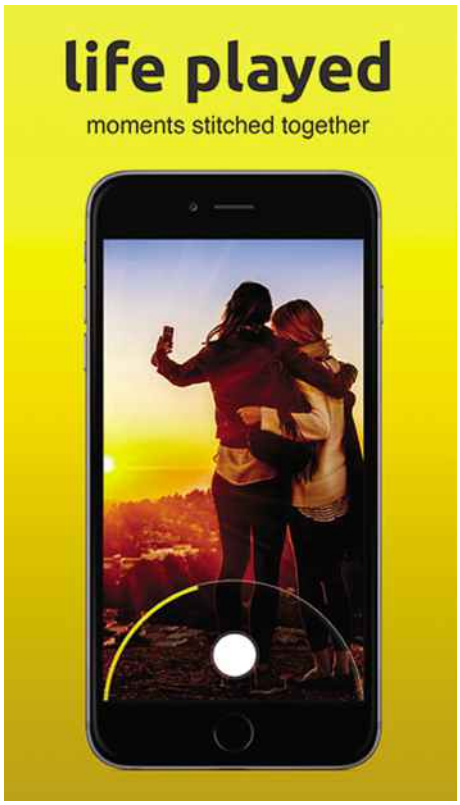
# App Of The Week

# eva

## We look at a new video based social media app this week

Social media is big. Mind bogglingly big. In fact, it's estimated that over two billion people currently use some form of social media; that's at least one in every four of us worldwide. It's growing too, at a rate of around 300 million users per year.

We now have the ability to share virtually every aspect of our lives as an image, video or just a string of text. Whether sharing all of it is a good thing or not is up to you to decide, but you can't knock the potential for bringing friends and family together more and sharing life's experiences near the instant they happen. It's little wonder then, that UK developer Forbidden Technologies has sought to find the latest social media breakthrough.




*Eva has a lot going for it, become a part of it early and watch it grow*

*If you live by social media and engage with the world, then Eva could be the app for you*

### Socially Eva After

Eva is a new video social network that uses Forbidden Technologies' industry leading cloud video platform, Forscene, to allow the user to watch, create, share and engage in content from around the globe.

Using the patent-pending 'Evafeed', you can scan through the collective content of thousands of users based on your own interests, location and the friends and acquaintances you decide to follow. All you need to do is simply launch the app and the feed will start playing using your pre-defined preferences.

You can shoot your own footage and upload it to the eva cloud using your profile, then much like a YouTube video you can share it with friends and either comment on others or allows others to comment on your video. Also, you can include tags, include friends and through the video platform express whatever ideas or world views you have based on the footage you've taken.

Described as 'YouTube for the Instagram generation', Eva hopes to become the world's leading social video sharing platform. And with more features due to be made available soon, such as a filter pack and trim feature, it may well be able to nab a good share of the social media market space.

### Features At A Glance

- Available for free for iOS
- Developed by UK-based Forbidden Technologies plc – developer of the world's most powerful professional cloud video editor: Forscene
- New video social network allows people to shoot and share videos in full screen portrait
- 'Evafeed' – public stream of content. Relevant content played immediately upon opening the app, requiring zero interaction
- Totally cloud-based – no need to worry about using up your smartphone's memory
- Incredible user experience that is slick, simple and intuitive

### The Growing Network

There appears to have been a lot of thought and focus gone into making Eva a well balanced, great looking app. There's not doubting, however, that it has an uphill climb ahead if it's to make its mark as a go-to app for sharing video content.

However, based on what we've seen so far the future is looking bright for this expressive app. With more content being added by the second and more members joining the fold every day, expect to see Eva making the headlines and becoming as big as the developers hope in the coming months.

If you're interested and want to get in early with a unique username then head on over to the iTunes Eva page (**goo.gl/L5dqTi**) and get it quick.

# Logging Off

You are about to enter another dimension, a dimension not only of sight and sound but of mind. A journey into a wondrous land of imagination... That's the signpost up ahead – your next stop, the Microsoft Phone!

With huge apologies to the late Rod Serling, I felt some of his words best described where those who went down the Windows Mobile rabbit-hole find themselves. Because, having jumped through some amazing hoops (like buying Nokia) the place the company finds itself today in respect of these ambitions makes the Greek Debt crisis seem like a beautifully crafted model of logic.

To recap: Microsoft ignored mobile until Apple and Google made them reassess those poor choices. Then it shanghaied the failing Nokia into its mobile adventure, before buying the company, having never exceeded 3% of the Smartphone market. Then it stopped making new flagship phones, instead seeding the feature phone market and losing even more market share.Finally, it fired almost everyone involved, and now tells us that it has a new strategy for the phone that involves flagship designs and OEMs!

The acronym WTF doesn't accurately describe my response to those assertions because, if you've fired most of the phone team, who will build your flagships? And, for that matter what OEM is bonkers enough to make a Windows mobile phone, anyway?

The line that made me laugh the most was this," If there are a lot of OEMs, we'll have one strategy. If there are no OEMs, we'll have one strategy."

Would that be the just-stop-making-phones plan, Satya?

I think what annoys me most about this is that he made it pretty clear early on that he didn't want to buy Nokia, but went along with it to smooth the transition from Steve 'whispering' Ballmer. What's transpired since must have strongly convinced him that he should have stuck to his own convictions, because blowing billions to say 'I told you so' seems excessive – even in US corporate circles.

In the past week, Satya's given an interview to well-respected tech journalist Mary JO Foley, where he tried to argue that the phone is still a key part of Microsoft's strategy. Well sure, given that without it the whole universal apps side of Windows 10 is largely pointless, and it practically condemns the Surface line too.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When he said "One Windows", it was assumed that he meant that one OS would run on all platforms, but more likely now there will only be one platform, the PC, to deliver that One Windows on. And now, he's also pushing the line that they only made Windows 10 free to help the phone, entirely ignoring the failure of Windows 8 and the shrinking PC market as major factors.

Let's not focus on how Microsoft talks up one of its most public failings, though, but instead think about those nice people who bought a Lumia. Where does all this leave them?

Frankly, it leaves them with little more than a lot of elegant, but largely substance-free, words from Microsoft's CEO, and promises that it's committed to new phones, sometime this year. As for the device you've got, it might get Windows 10, or not, depending on what model it is and who your service is provided by. If this doesn't make you consider the huge selection of Android devices, I'm not sure what else would.

*Mark Pickavance*

## LAST WEEK'S CROSSWORD

**Across:** **1** Bond, **3** Isochron, **9** Decoder, **10** Issue, **11** Short-Circuit, **13** Aspire, **15** Adidas, **17** Creationists, **20** Haiti, **21** Dracula, **22** Nintendo, **23** Ploy.
**Down:** **1** Bodes Law, **2** Nacho, **4** Strain, **5** Coincidental, **6** Rescind, **7** Need, **8** Editorialize, **12** Isostasy, **14** Permian, **16** Gilded, **18** Stull, **19** Thin.

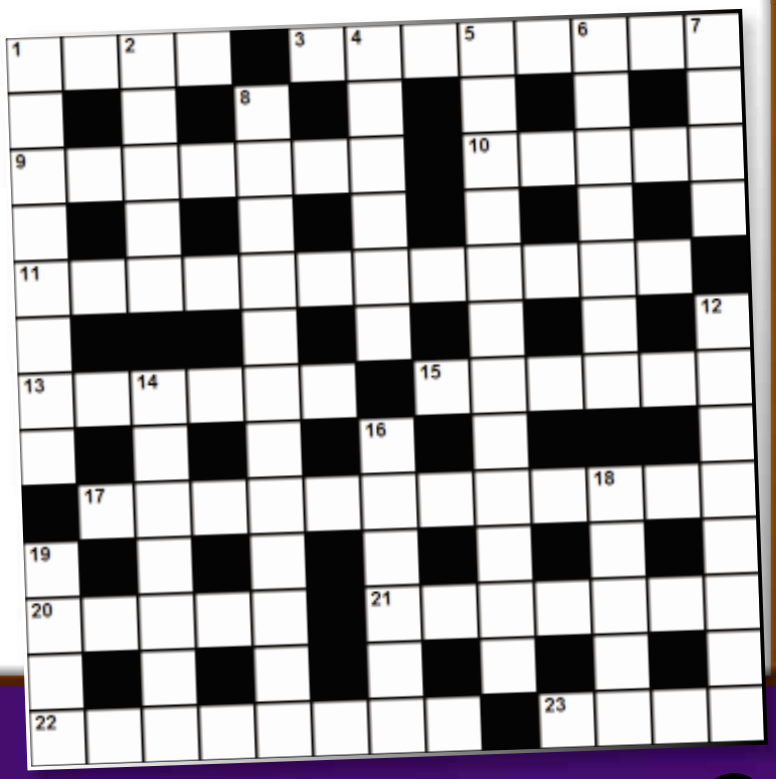
## THIS WEEK'S CROSSWORD

**Across**

**1** A star showing a sudden large increase in brightness and then slowly returning to its original state over a few months. (4)
**3** In Norse mythology, the watchman of the gods. (8)
**9** Slang term for completely mad or demented. (7)
**10** Feminine given name deriving originally from the Middle Egyptian word for lotus flower. (5)
**11** The policy of leaving things to take their own course, without interfering. (7-5)
**13** Coordinates and integrates American federal research on changes in the global environment and their implications for society. The program began as a presidential initiative in 1989. (Abbr) (6)
**15** Hindu festival celebrating the end of the monsoon. (6)
**17** Remove uncertainty of meaning from a sentence, phrase, or other linguistic unit. (12)
**20** Civilian dress worn by a person who is entitled to wear a military uniform. (5)
**21** Well-paid young middle-class professionals who work in the city and lead a luxurious lifestyle. (7)
**22** Residents of rented properties on an estate considered as a group. (8)
**23** A magnitude or frequency relative to a time unit. (4)

**Down**

**1** Lacking definition or definite content. (8)
**2** Italian composer whose operas include La Traviata and Aida. (5)
**4** An ancient Egyptian city on the west bank of the Nile opposite Cairo; site of three Great Pyramids and the Sphinx. (2,4)
**5** A pre-written routine and tool for building software applications to send emails & texts. (9,3)
**6** .at TLD. (7)
**7** Popularly abbreviated word to describe a hypertext connection between two documents. (4)
**8** A treatise advancing a new point of view resulting from research; usually a requirement for an advanced academic degree. (12)
**12** Someone to whom a licence is granted. (8)
**14** Winged monster with the head of an eagle and the body of a lion. (7)
**16** Leading electronic commerce retailer based in Howden Yorkshire. (6)
**18** A family of personal computers marketed by Commodore in the 1980s and 1990s. (5)
**19** Leave out or exclude someone or something, either intentionally or forgetfully. (4)



**DISCLAIMER**
The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. We like a bit of cycling, it has to be said. We took an initial interest in the sport as a way of having a hobby that didn't have anything to do with sitting in front of a screen for hours on end – so it's funny when, from time to time, the two interests meet. This year's Tour de France has been such a convergance, with Team Sky alleging that important data on the power output of winner-in-waiting (as we write) Chris Froome was 'hacked' from its computers. As is often the case with this kind of thing, others allege it was actually an inside job perpetrated by someone with legitimate access – a whistleblower, if you will. It's a salutary reminder that humans are often the cause of data breaches; either because we can't be bothered to use strong or varied enough passwords or neglect to pay attention to what other people are doing with our computer systems. It's also highlights another way computers now integrate with everything we do, now days – even just riding a bike. We, of course, are more than happy to share our Strava data with anyone who cares to gaze in wonder at our prowess on two wheels – though we get accused of being 'dopey' rather more than being a 'doper'...

# In Next Week's Micro Mart*

- Education special!
- The very best tablets and laptops for every budget
- Gadgets and online services for students
- What is DAB+ and why don't we have it in the UK?
- Plus the usual mix of news, reviews and advice

* May be subject to change

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